



MOHAMED BIN ZAYED
UNIVERSITY OF
ARTIFICIAL INTELLIGENCE

MBZUAI
**Faculty
Portfolio**
2024-2025



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A nighttime photograph of a modern university building with a large, curved facade and glass windows. The building is illuminated from within, and the sky is a deep blue. In the foreground, there are several palm trees and a fountain with several jets of water. The overall scene is a well-lit, modern campus environment.

THE UNIVERSITY MOTTO

POWER FROM KNOWLEDGE TO SERVE



About MBZUAI

The Mohamed bin Zayed University of Artificial Intelligence (MBZUAI) is established in the Emirate of Abu Dhabi, with a clear mission to drive AI knowledge creation and development, foster economic and social growth, and position the UAE as a hub for the international AI community.

The university, in addition to its academic offerings, will have a direct and indirect impact on AI advancement in the UAE in multiple ways including, but not limited to:

- Attracting international talents (students and faculty staff) and ensuring the transition to enter the UAE market
- Creating an active AI community and collaborating in AI research and publications
- Hosting conferences that attract AI experts to the UAE and the region
- Supporting technology and AI related startups in the UAE
- Supporting governments and businesses by providing AI consulting services and AI solutions/ applications
- Conducting training and workshops in various AI fields for government entities and businesses.

MBZUAI currently offers Ph.D. and M.Sc. programs in five AI specializations including machine learning (ML), computer vision (CV), natural language processing (NLP), robotics (ROB) and computer science (CS).

Vision, mission and strategic objectives



Vision

Drive excellence in knowledge creation, transfer and use of AI to foster economic growth and position Abu Dhabi as a hub for the international AI community.



Mission

Establish and continually evolve interdisciplinary, collaborative research and development capability in the field of AI, while educating students to be innovators and leaders with the breadth and depth to grow technology and enterprise in the UAE and globally.



Strategic objectives

As a unique institution, purpose built to lead the world in AI research, MBZUAI seeks to be a paradise for transformative research; a cradle for the best minds in computer science; and a hub for startups and high-tech innovation.

Its strategic objectives are:

- Attract the best talent focused on AI
- Develop, train, and retain talent for the UAE economy
- Lead Abu Dhabi's efforts to build and sustain an AI- based knowledge economy
- Develop real business applications in collaboration with industry and the public sector to enhance innovation, productivity, and growth
- Be the birthplace for high-tech innovation and AI startups in the UAE and the MENA region.





A message from our president

AI has emerged as a novel and disruptive technology promising to transform traditional industries and create new ones along the way. It is enabling new capabilities, redefining business models and public policy, and lifting scientific discovery to new heights. AI is the transformative technology of our era. Like the steam engine, electricity and semiconductors before it, AI is reshaping people's lives and the societies in which we live.

MBZUAI is in an ideal position to lead the region, and the world, in AI research, teaching, and innovation. As the world's first university dedicated to AI education, research and innovation, it is our mission to empower brilliant minds in AI—to develop the talent, and the technologies, of the future. This all centers around our world-class faculty.

The women and men we have recruited to found this university, and to lead research and innovation for the coming decades, are leaders in this burgeoning field of AI. Their education and experiences in academia and industry make them powerful mentors, role models, entrepreneurs and coauthors for the talent we are developing in our master's and doctoral programs, in our executive educational offerings, and in our startup environment.

Our advanced curriculum is aligned with technologies that have the potential to solve some of the biggest challenges facing business and society today. As a university, we are a key initiative under the UAE's national AI strategy, which is poised to play a pivotal role in supporting the nation's efforts to build and sustain an AI-based knowledge economy, while enabling local innovation clusters and AI startups.

At MBZUAI, we want you to receive the best possible training from the best faculty in AI. We want to help you become leaders that will change the world. We encourage you to challenge existing paradigms, to think creatively and independently, and to overcome limits.

Sincerely,

Professor Eric Xing
MBZUAI President and University Professor

World-class educators

Overview

Working collaboratively with students, postdocs, and researchers, MBZUAI faculty encourage aiming higher and looking deeper in pursuit of research excellence and innovation. Through coursework, research, entrepreneurial activities, and social interaction, faculty, and students both learn from and challenge each other in a nurturing and challenging university environment.

MBZUAI students have immediate access to some of the world's brightest minds in AI. Faculty come from all over the world, with an academic heritage that threads through the preeminent institutions of global higher education.

MBZUAI faculty are fellows of top scientific societies; they are editors in some of the most prestigious journals; and they have worked in some of the top public and private sector institutions leading the way in AI research and implementation. MBZUAI offers five M.Sc. and Ph.D. programs in the following areas of AI specialization:

Computer science (CS)

Recognized as the foundation of modern technology, computer science offers an intricate yet exciting academic journey, packed with the nuances of evolving innovation and multidimensional challenges. Our computer science degrees cover the sufficient breadth and depth in advanced computational theory, computational and combinatorial optimization, advanced data structures, and modern operating systems – all while exploring the rich landscape of software design and artificial intelligence. The curriculum is carefully designed to provide students with an in-depth understanding of the complex theoretical frameworks that drive the evolution of digital technologies and their diverse applications. We emphasize the development of rigorous problem-solving abilities, critical analytical thinking, and technical acumen. As a result, our computer science graduates will be armed with the essential tools to navigate and reshape the evolving landscape of technology – thus pushing the constant pursuit of progress and exploration in the field of computing.

Computer vision (CV)

This scientific field studies how computers can be used to automatically understand and interpret visual imagery. It aims to mimic the astounding capabilities of human visual cortex using machine vision algorithms. It studies how an image is created, the geometry of the 3D world and high-level tasks such as object recognition, object detection, and tracking, image segmentation and action recognition. Computer vision has important applications in augmented / virtual reality, autonomous cars, service robots, biometrics and forensics, remote sensing and security and surveillance.

Machine learning (ML)

The scientific study of algorithms and statistical models that computer systems use to effectively perform a specific task without using explicit instructions, relying on patterns and inference instead. These algorithms are based on mathematical models learned automatically from data, thus allowing machines to intelligently interpret and analyze input data to derive useful knowledge and arrive at important conclusions. Machine learning is heavily used for enterprise applications (e.g. business intelligence and analytics), effective web search, robotics, smart cities and understanding of the human genome.

Natural language processing (NLP)

NLP focuses on system development that allows computers to communicate with people using everyday language. Natural language generation systems convert information from the computer database into readable or audible human language and vice versa. Such systems also enable sophisticated tasks such as inter-language translation, semantic understanding, text summarization and holding a dialog. The key applications of NLP algorithms include interactive voice response applications, automated translators, digital personal assistants (e.g. Siri, Cortana, Alexa), chatbots, and smart word processors.

Robotics (ROB)

Our M.Sc. and Ph.D. in robotics focus on human-centred and autonomous robotics research and prepare exceptional students for careers at the cutting edge of academia, industry, and government. Our world-leading robotics researchers, students and industry partners collaborate to advance discoveries in various aspects of robotics, such as perception and applied machine learning, human-robot interaction, cognitive and soft robotics, and swarm intelligence.

Academic calendar 2023–2024

	Day	Date	Event
Fall semester (2023)	Mon–Fri	Aug 14–18	Students' orientation
	Mon	Aug 21	First day of classes
	Fri	Aug 25	Last day to add/drop courses
	Fri	Sept 1	Last day to apply for course withdrawal/ leave of absence without penalty
	Mon–Wed	Aug 14–Sep 6	Supervisors' selection process
	Fri	Nov 17	Publish the spring 2024 class schedule
	Mon–Fri	Nov 20–24	Early registration for spring 2024 semester
	Tue	Dec 5	Last day of classes
	Wed–Fri	Dec 6–8	Final exams preparation period
	Sun–Thu	Dec 10–14	Final exams period
	Fri	Dec 15	360 meeting – all faculty
	Tues	Dec 19	Faculty to submit grades
	Mon	Dec 25	Grades announcement
	Thu	Dec 28	Students' deadline to submit grade appeals
Winter Break	Fri–Fri	Dec 15, 2023– Jan 5, 2024	Winter break for students
	Wed–Tue	Dec 20, 2023– Jan 2, 2024	Winter break for faculty

The official holidays observed by the university during the fall 2023 semester:

Occasion	Date	Holiday duration
Prophet Mohammed Birthday	Sep 26 or Sep 27, 2023	One day
Commemoration Day	Dec 1, 2023	One day
UAE National Day	Dec 2, 3, 2023	Two days

Spring semester (2024)	Day	Date	Event
	Mon	Jan 8	First day of classes
	Fri	Jan 12	Last day to add/drop courses
	Mon–Tue	Jan 15–Apr 30	Fall 2022 cohort – M.Sc. students/ application for Ph.D. articulation
	Fri	Jan 26	Last day to apply for course withdrawal/ leave of absence without penalty
	Mon	Mar 25	Fall 2022 cohort – M.Sc. students’ final deadline for thesis submission

Spring break	Day	Date	Event
	Mon–Fri	Mar 25–29	Spring break for students/faculty

Spring semester continues (2024)	Day	Date	Event
	Thu	Apr 4	Fall 2022 cohort – M.Sc. students’ final deadline for thesis defense
	Fri	Apr 12	Publish the fall 2024 class schedule
	Mon	Apr 15	Fall 2022 cohort – Ph.D. students’ deadline to sit for the candidacy (oral) exam
	Mon–Fri	Apr 15–19	Early registration for fall 2024 semester
	Wed	May 1	Last day of classes
	Thu–Mon	May 2–6	Final exams preparation period
	Tue–Mon	May 7–13	Final exams period
	Tue	May 14	360 meeting – all faculty
	Thu	May 16	Faculty to submit grades
	Thu	May 23	Grades announcement
	Wed	May 29	Students’ deadline to submit grade appeals
	Mon	May 27	Qualifying exam for Ph.D. students – first attempt
	Mon	Jun 10	Qualifying exam for Ph.D. students – second attempt
Thu	Jun 13	Official Commencement ceremony	

Summer	Day	Date	Event
	Wed	May 15	Start of summer vacation for students
	Mon	May 20	Start of summer vacation for faculty

The official holidays observed by the university during the spring 2024 semester:

Occasion	Date	Holiday duration
Eid Al Fitr Holiday	April 10–12	Three days

Leadership



Eric Xing

President
Professor of Computer Science
and Machine Learning

Research interests

Xing's main research interests are the development of machine learning and statistical methodology, and large-scale computational systems and architectures, for solving problems involving automated learning, reasoning, and decision-making in high-dimensional, multimodal, and dynamic possible worlds in artificial, biological, and social systems.

Education

- **Ph.D. in molecular biology and biochemistry from** Rutgers University, USA
- **Ph.D. in computer science** from the University of California, USA

Publishing

Xing has authored or contributed to more than 400 cited research papers and reports. His research has been cited more than 44,000 times by leading academics and academic journals.

Distance metric learning with application to clustering with side-information. E Xing, M Jordan, SJ Russell, A Ng. *Advances in neural information processing systems* 15, 2002.

Mixed membership stochastic blockmodels. EM Airoldi, D Blei, S Fienberg, E Xing. *Advances in neural information processing systems* 21, 2008.

Object bank: A high-level image representation for scene classification & semantic feature sparsification. LJ Li, H Su, L Fei-Fei, E Xing. *Advances in neural information processing systems* 23, 2010.

Theoretically principled trade-off between robustness and accuracy. H Zhang, Y Yu, J Jiao, E Xing, L El Ghaoui, M Jordan. *International conference on machine learning*, 7472-7482, 2019.

Feature selection for high-dimensional genomic microarray data. EP Xing, MI Jordan, RM Karp. *Icml* 1, 601-608, 2001.

Toward controlled generation of text. Z Hu, Z Yang, X Liang, R Salakhutdinov, EP Xing. *International conference on machine learning*, 1587-1596, 2017.

Career

Prior to joining MBZUAI, Xing was a professor of computer science at Carnegie Mellon University where he was the founding director of the Center for Machine Learning and Health. Xing has also served as visiting associate professor at Stanford University, and visiting research professor at Facebook Inc.

He is also the founder, chairman, and chief scientist of Petuum Inc., which was recognized as a 2018 World Economic Forum Technology Pioneer that builds standardized artificial intelligence development platforms and operating systems for broad and general industrial AI applications.

Xing is a recipient of the National Science Foundation (NSF) Career Award, the Alfred P. Sloan Research Fellowship in Computer Science, the United States Air Force Office of Scientific Research Young Investigator Award, and the IBM Open Collaborative Research Faculty Award.

He is a board member of the International Machine Learning Society. He is a fellow of the Association of Advancement of Artificial Intelligence (AAAI), and an Institute of Electrical and Electronics Engineers (IEEE) fellow. In 2022, he was named as a Fellow of the American Statistical Association and a Fellow of the Association for Computing Machinery (ACM). In 2023, he became a Fellow of the Institute of Mathematical Statistics (IMS).

Leadership



Timothy Baldwin

Acting Provost
Associate Provost for Academic Affairs, and
Professor of Natural Language Processing

Research interests

Baldwin's primary research focus is on natural language processing (NLP), including deep learning, algorithmic fairness, computational social science, and social media analytics.

Education

- **Ph.D. in computer science from the Tokyo Institute of Technology, Japan**
- **Master of Engineering in computer science** from the Tokyo Institute of Technology, Japan
- **Bachelor of Science in computer science and mathematics** from the University of Melbourne, Australia
- **Bachelor of Arts (Linguistics/Japanese)** from the University of Melbourne, Australia

Publishing

Baldwin is the author of more than 400 peer-reviewed publications across diverse topics in natural language processing and AI.

Subramanian, Shivashankar, Afshin Rahimi, Timothy Baldwin, Trevor Cohn and Lea Frermann (2021) Fairness-aware Class Imbalanced Learning, In Proceedings of the 2021 Conference on Empirical Methods in Natural Language Processing (EMNLP 2021), Online and Punta Cana, Dominican Republic, pp. 2045–2051.

Subramanian, Shivashankar, Afshin Rahimi, Timothy Baldwin, Trevor Cohn and Lea Frermann (2021) Fairness-aware Class Imbalanced Learning, In Proceedings of the 2021 Conference on Empirical Methods in Natural Language Processing (EMNLP 2021), Online and Punta Cana, Dominican Republic, pp. 2045–2051.

Aji, Alham Fikri, Genta Indra Winata, Fajri Koto, Samuel Cahyawijaya, Ade Romadhony, Rahmad Mahendra, Kemal Kurniawan, David Moeljadi, Radityo Eko Prasajo, Timothy Baldwin, Jey Han Lau, Sebastian Ruder (to appear) One Country, 700+ Languages: NLP Challenges for Underrepresented Languages and Dialects in Indonesia, In Proceedings of the 60th Annual Meeting of the Association for Computational Linguistics (ACL 2022).

Han, Xudong, Timothy Baldwin and Trevor Cohn (2021) Diverse Adversaries for Mitigating Bias in Training, In Proceedings of the 16th Conference of the European Chapter of the Association for Computational Linguistics (EACL 2021), virtual, pp. 2760–2765.

Bhatia, Shraey, Jey Han Lau and Timothy Baldwin (2021) Automatic Classification of Neutralization Techniques in the Narrative of Climate Change Scepticism, In Proceedings of the 2021 Conference of the North American Chapter of the Association for Computational Linguistics – Human Language Technologies (NAACL HLT 2021), virtual..

Koto, Fajri, Jey Han Lau and Timothy Baldwin (2021) Top-down Discourse Parsing via Sequence Labelling, In Proceedings of the 16th Conference of the European Chapter of the Association for Computational Linguistics (EACL 2021), virtual, pp. 715-726.

Career

Prior to joining MBZUAI, Baldwin spent 17 years at the University of Melbourne, including roles as Melbourne Laureate Professor, Director of the ARC Training Centre in Cognitive Computing for Medical Technologies (in partnership with IBM), Associate Dean Research Training in the Melbourne School of Engineering, and Deputy Head of the Department of Computing and Information Systems.

He has previously held visiting positions at Cambridge University, University of Washington, University of Tokyo, Saarland University, NTT Communication Science Laboratories, and National Institute of Informatics.

Prior to joining the University of Melbourne in 2004, he was a senior research engineer at the Center for the Study of Language and Information, Stanford University (2001-2004).

Baldwin is president of the Association for Computational Linguistics (ACL 2022). an Institute of Electrical and Electronics Engineers (IEEE) fellow. In 2022, Xing was elected a fellow of the American Statistical Association (ASA). In the past, he served as the program chair (2014) and general chair (2019) of the International Conference of Machine Learning (ICML).

Distinguished faculty



Sir Michael Brady

Adjunct Distinguished Professor

Research interests

Brady's research focus is in real-world medical image analysis solutions which he successfully commercialized for industry on several occasions. His current work is predominantly focused on: quantitative MRI of the liver, pancreas, and breast; mammography and tomosynthesis; assessment of trabecular structures for early evidence of osteoporosis; and the application of Bayesian Networks for causal reasoning about multi-organ conditions, particularly type-2 diabetes.

Education

- **Ph.D. in mathematics** from the Australian National University (ANU), Australia
- **Master's in mathematics** from the University of Manchester, United Kingdom
- **Bachelor of Science (1st class honors) in mathematics** from the University of Manchester, United Kingdom

Publishing

Brady is the author of more than 500 articles and 50 patents in computer vision, robotics, medical image analysis, and artificial intelligence, and the author or editor of 10 books.

Tom Waddell, Alexandre Bagur, Diogo Cunha, Helena Thomaides-Breiar, Rajarshi Banerjee, Daniel J Cuthbertson, Emily Brown, Kenneth Cusi, Michael Brady, Greater ectopic fat deposition, liver fibroinflammation and lower skeletal muscle mass in people with type 2 diabetes: a UK Biobank analysis, Obesity (accepted for publication)

Daniel Bulte, Matthew Robson, Michael Brady, Alexandre Triay Bagur, Pancreas Ectopic Fat: Imaging-based Quantification, chapter in Visceral and Ectopic Fat: Risk Factors for Type 2 Diabetes, Atherosclerosis, and Cardiovascular Disease, Ed. Hildo J. Lamb, Elsevier 2022

Richard Sidebottom, Sarah Vinnicombe, Michael Brady, Iain Lyburn, Fair shares: building and benefiting from healthcare AI with mutually beneficial structures and development partnerships, Br. J. Radiology, 2021

Faraz Janan and Michael Brady, RICE: A Method for Quantitative Mammographic Image Enhancement, Medical Image Analysis, 2021

James Oowler, Alexandre Triay Bagur Scott Marriage, Zobair Arya, Paul Aljabar, John McGonigle, Sir Michael Brady, and Daniel Bulte, Pancreas Volumetry in UK Biobank: Comparison of Models and Inference at Scale, Proc. Annual Conference on Medical Image Understanding and Analysis, 2021

Alexandre Triay Bagur, Paul Aljabar, Zobair Arya, John McGonigle, Sir Michael Brady, and Daniel Bulte, Slice-to-Volume Registration Enables Automated Pancreas MRI Quantification in UK Biobank, Proc. Annual Conference on Medical Image Understanding and Analysis, 2021

Career

Brady was associate director of the AI Laboratory at MIT from 1980 to 1985, leaving to take up the newly created Professorship of Information Engineering, University of Oxford, which he held from 1985 to 2010.

He is the emeritus professor of oncological imaging in the Department of Oncology of the University of Oxford.

Brady has been elected a fellow of the Royal Society, fellow of the Royal Academy of Engineering, membre associé étranger of the Académie des Sciences, and an honorary fellow of the Institution of Engineering and Technology.

Brady is also a fellow of the Institute of Physics, a fellow of the Academy of Medical Sciences, a fellow of the American Association of AI, and a fellow of the British Computer Society.

Brady has founded successful companies, primarily in medical image analysis and was a director of Oxford Instruments plc.

Distinguished faculty



Michael I. Jordan

Laureate Professor
Honorary Program Director
of MBZUAI Laureate Faculty Program

Research interests

Jordan's research interests bridge the computational, statistical, cognitive, biological and social sciences. Jordan developed recurrent neural networks as a cognitive model, and his work is less driven from a cognitive perspective and more from the background of traditional statistics. Jordan popularized Bayesian networks in the machine learning community and is known for pointing out links between machine learning and statistics. He has also been prominent in the formalization of variational methods for approximate inference and the popularization of the expectation-maximization algorithm in machine learning.

Education

- **Ph.D. in cognitive science** from the University of California, USA
- **Master of Science in mathematics** from Arizona State University, USA
- **Bachelor of Science in psychology** from Louisiana State University, USA

Publishing

Jordan is one of the leading figures in machine learning, and in 2016 Science named him the world's most influential computer scientist.

J. D. Lee, M. Jordan, B. Recht, and M. Simchowitz, "Gradient Descent Only Converges to Minimizers," in Proceedings of the 29th Conference on Learning Theory, {COLT} 2016, New York, USA, June 23-26, 2016, 2016, pp. 1246--1257.

X. Pan, M. Lam, S. Tu, D. Papailiopoulos, C. Zhang, M. Jordan, K. Ramchandran, C. Re, and B. Recht, "Cyclades: Conflict-free Asynchronous Machine Learning," in Advances in Neural Information Processing Systems 29, 2016.

X. Pan, D. Papailiopoulos, S. Omyak, B. Recht, K. Ramchandran, and M. Jordan, "Parallel correlation clustering on big graphs," in Advances in Neural Information Processing Systems 28, 2015, pp. 82--90.

X. Pan, S. Jegelka, J. E. Gonzalez, J. K. Bradley, and M. Jordan, "Parallel Double Greedy Submodular Maximization," in Advances in Neural Information Processing Systems 27, 2014.

X. Pan, J. E. Gonzalez, S. Jegelka, T. Broderick, and M. Jordan, "Optimistic concurrency control for distributed unsupervised learning," in Advances in Neural Information Processing Systems 26, 2013, pp. 1403--1411.

B. Taskar, S. Lacoste Julien, and M. Jordan, "Structured prediction, dual extragradient and Bregman projections," J. Machine Learning Research, vol. 7, pp. 1627-1653, Dec. 2006.

Career

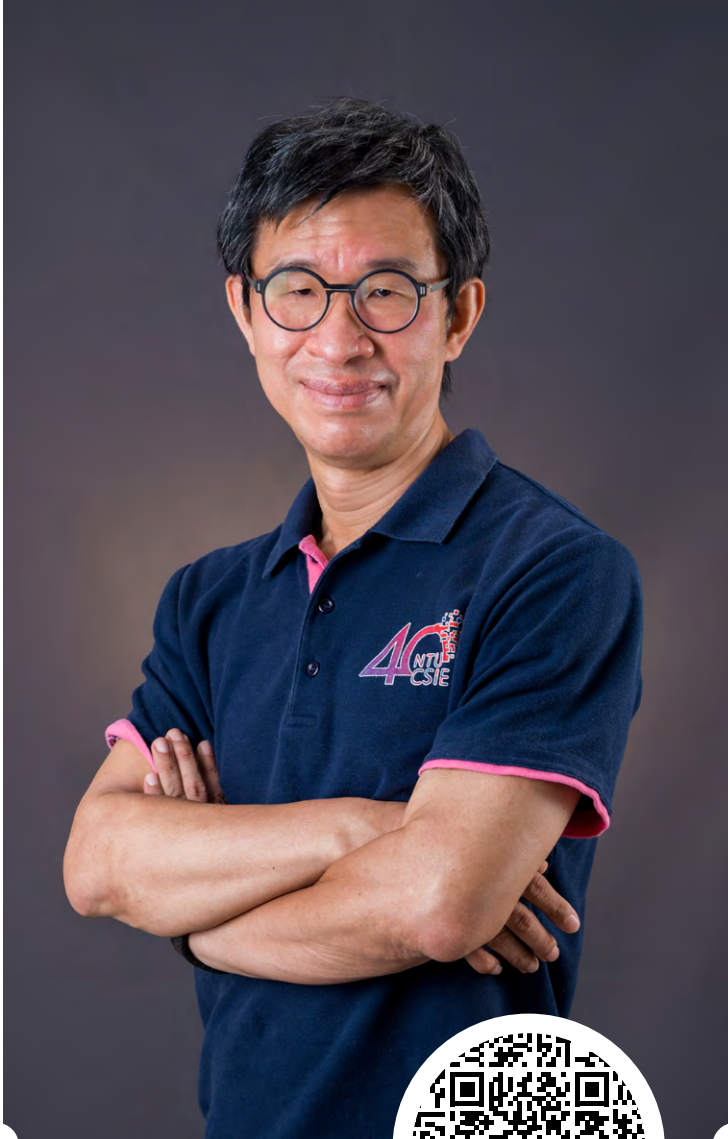
Jordan is the Pehong Chen Distinguished Professor in the Department of Electrical Engineering and Computer Science and the Department of Statistics at the University of California, Berkeley. Jordan has been awarded an honorary doctorate from Yale University. He is the 2020 IEEE John von Neumann Medal winner.

He has been named a Neyman Lecturer and a Medallion Lecturer by the Institute of Mathematical Statistics. Jordan received the IJCAI Research Excellence Award in 2016, the David E. Rumelhart Award in 2015 and the ACM/AAAI Allen Newell Award in 2009.

He is a Fellow of the Association of Advancement of Artificial Intelligence (AAAI), ASA, CSS, IEEE, IMS, Bayesian Analysis (ISBA) and Society for Industrial and Applied Mathematics (SIAM).



Department of
Computer Science



Shih-Hao Hung

Visiting Professor
of Computer Science and **Advisor**

Research interests

Hung loves building high-performance, intelligent, and secure computers. His research interests lie widely in high-performance computing (HPC) systems, artificial intelligence (AI), information security, privacy-enhancing technologies, and quantum computing. His research team aims to develop methodologies to help characterize complex computing systems to empower hardware-software co-design for emerging applications.

Education

- **Ph.D. in computer science and engineering** from the University of Michigan,
- **Master of Science in computer science and engineering** from the University of Michigan, USA.
- **Bachelor of Science in electrical engineering** from the National Taiwan University, Taiwan.

Publishing

Shih-Chiang Huang, Chi-Chung Chen, Jui Lan, Tsan-Yu Hsieh, Huei-Chieh Chuang, Meng-Yao Chien, Tao-Sheng Ou, Kuang-Hua Chen, Ren-Chin Wu, Yu-Jen Liu, Chi-Tung Cheng, Yu-Jen Huang, Liang-Wei Tao, An-Fong Hwu, I-Chieh Lin, Shih-Hao Hung, Chao-Yuan Yeh, Tse-Ching Chen (2022, Jun). Deep neural network trained on gigapixel images improves lymph node metastasis detection in clinical settings. *Nature Communications*, 13, 3347 (2022).

Cheng-Han Lu, Shih-Hao Hung (2022, Dec). FEZ: a Flexible and Efficient Zoom-in Method for Ultra-large Image Classification. 2022 IEEE International Conference on Big Data (IEEE BigData 2022), Osaka, Japan.

Chuan-Chi Wang, Chun-Yen Ho, Chia-Heng Tu, Shih-Hao Hung (2022, Apr). cuPSO: GPU parallelization for particle swarm optimization algorithms. SAC '22: The 37th ACM/SIGAPP Symposium on Applied Computing: 1183-1189..

Yi-Hua Chung, Cheng-Jhih Shih, Shih-Hao Hung (2022, May). Accelerating Simulated Quantum Annealing with GPU and Tensor Cores. ISC High Performance 2022 (ISC 2022), Hamburg, Germany. 174-191

Chuan-Chi Wang, Ying-Chiao Liao, Ming-Chang Kao, Wen-Yew Liang, Shih-Hao Hung (2021, Jul). Toward accurate platform-aware performance modelling for deep neural networks. *ACM SIGAPP Applied Computing Review*, 21(1), 50-61.

Min-Yu Tsai, Zhen Tian, Nan Qin, Congchong Yan, Youfang Lai, Shih-Hao Hung, Yujie Chi, Xun Jia (2020, Apr). A new open-source GPU-based microscopic Monte Carlo simulation tool for the calculations of DNA damages caused by ionizing radiation---Part I: Core algorithm and validation. *Medical physics*, 47(4), 1958-1970.

Career

Hung has been with the National Taiwan University (NTU) since 2005, where he served as the Chair of the Department of Computer Science and Information Engineering during 2020–2023. Recently, he has led his research teams to design high-performance GPU clusters and collaborate with domain experts in analyzing gigapixel medical images, training large language models (LLMs), and simulating large-scale quantum computing systems.

He also currently works as a researcher for the National Center for High-Performance Computing (NCHC), where he served as the Deputy Director General during 2020–2022, when he has played an instrumental role to establish national supercomputing infrastructures to enable HPC and AI research. During the past five years, the NCHC has established three top-notch supercomputer services, including one that delivered nine petaFLOPS to be ranked 20th in the world.

Hung also likes to put his research works in practice and collaborate with industry partners. Before joining NTU, he worked as a staff engineer for Sun Microsystems Inc. in Menlo Park, California, during 2000–2004, where he led a team effort to achieve a performance record for a single secure webserver with crypto acceleration. During his tenure in NTU, he has collaborated with worldwide system/chip vendors such as IBM, HPE, Qualcomm, ARM, Intel, NVIDIA, and AMD, as well as top-tier Taiwanese tech companies, including MediaTek, QNAP Systems, Foxconn, Inventec, Wistron, Adlink, Asus Cloud, etc. He was the recipient of the IBM Faculty Open Collaborative Research Award in 2012 and 2013, Best Paper Awards from ACM RACS Conference in 2014 and 2017, and Future Tech Award from the National Science and Technology Council in 2022.



Department of
Computer Science



Tei-Wei Kuo

Visiting Adjunct Professor
of Computer Science and **Senior Research Advisor**

Research interests

Kuo's research interests include embedded systems, non-volatile memory storage/memory software designs (such as those of flash memory and PCM), neuromorphic computing, and real-time systems.

Education

- **Ph.D. in computer science** from University of Texas, USA
- **Master's in computer science** from University of Texas, USA
- **Bachelor in computer science and information engineering** from National Taiwan University, Taiwan

Publishing

Kuo has more than 300 technical papers published or been accepted in international journals and conferences.

Yin-Chiuan Chen, Chun-Feng Wu, Yuan-Hao Chang, and Tei-Wei Kuo, "Exploring Synchronous Page Fault Handling," IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), Volume 41, Issue 11, pp.3791-3802, November 2022. (Integrated with top embedded systems conference in ESWEEK:ACM/IEEE CODES+ISSS'22; Best Paper Award).

Wei-Ming Chen, Tei-Wei Kuo, and Pi-Cheng Hsiu, "Heterogeneity-aware Multicore Synchronization for Intermittent Systems", ACM Transactions on Embedded Computing Systems (TECS), 2021. Volume 20, Issue 5s, pp. 61:1-22, September 2021. (Integrated with top embedded systems conference in ESWEEK: ACM/IEEE CODES+ISSS'21).

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Qiao Li, Min Ye, Yufei Cui, Liang Shi, Xiaoqiang Li, Tei-Wei Kuo, and Chun Jason Xue, October, 2020, "Shaving Retries with Sentinels for Fast Read over High-Density 3D Flash," in Proceedings of the 53rd Annual IEEE/ACM International Symposium on Microarchitecture (Micro). Athens, Greece, pp. 483-495, October 17-20, 2020.

Wei-Chen Wang, Yuan-Hao Chang, Tei-Wei Kuo, Chien-Chung Ho, Yu-Ming Chang, and Hung-Sheng Chang, "Achieving Lossless Accuracy with Lossy Programming for Efficient Neural-Network Training on NVM-Based Systems," ACM Transactions on Embedded Computing Systems (TECS), Volume 18, Issue 5s, pp. 68:1-22, October 2019. (Integrated with top embedded systems conference in ESWEEK: ACM/IEEE CODES+ISSS'19; Best Paper Award).

Kuo is a distinguished professor of the Department of Computer Science and Information Engineering at National Taiwan University. Before joining MBZUAI, he took a temporary leave to join City University of Hong Kong as Lee Shau Kee Chair Professor of Information Engineering, Advisor to President (Information Technology), and Dean of College of Engineering between August 2019 and July 2022. He also previously served as Interim President and Executive Vice President for Academics and Research at National Taiwan University, Taiwan, and as a distinguished research fellow and director of research center for information technology innovation, Academia Sinica.

Kuo is a member of European Academy of Sciences and Arts. He is also a Fellow of ACM, IEEE, and US National Academy of Inventors. Kuo is Vice Chair of SIGAPP and Chair of Award Committee of ACM SIGBED. He received the highest honor from IEEE Technical Committee on Real-Time Systems in 2017: Outstanding Technical Achievement and Leadership Award, among a long list of distinguished awards.

Kuo is recognized as a pioneer in non-volatile memory software and systems. His research results were technically transferred to many storage and IC-design companies, such as acer, Macronix, Genesys Logic. His team is one of the first few in proposing the concept of unified memory (i.e., an integrated design of the main memory and storage) and its designs to conquer the challenges in data moving such as the performance gap between the main memory and ultra-low-latency storage systems.



Department of
Computer Vision



Ian Reid

Department Chair of Computer Vision and
Professor of Computer Vision

Research interests

Reid has a 30-year history of contributions across a wide range of computer vision areas including active vision, visual SLAM, visual geometry, human motion capture and visual surveillance. His current interests see a convergence of many of these themes under the umbrellas of spatial AI and embodied AI. His research aims to endow real physical agents with life-long visual learning capabilities, common-sense reasoning, and spatial awareness through video understanding for real-time robotic decision-making.

Education

- **DPhil in computer vision** from the University of Oxford, England, 1992
- **Bachelor of Science in computer science** with first class honours from the University of Western Australia, 1987.

Publishing

Reid is the author of some 300 peer-reviewed publications that have received more than 47,000 citations and an h-index of 101.

Guosheng Lin, Chunhua Shen, Anton van den Hengel, Ian Reid, Exploring Context with Deep Structured models for Semantic Segmentation, vol PP, DOI 10.1109/TPAMI.2017.2708714, T-PAMI, 2017

Cesar Dario Cadena Lerma, Luca Carlone, Henry Carrillo, Yasir Latif, Davide Scaramuzza, Jose Neira, Ian Reid and John Leonard, Past, Present, and Future of Simultaneous Localization And Mapping: Towards the Robust-Perception Age, IEEE Transactions on Robotics, vol 32, num 6, Dec 2016

Garg, Vijay BG Kumar, G. Carneiro and I Reid, Unsupervised CNN for Single View Depth Estimation: Geometry to the Rescue. European Conference on Computer Vision, 2016

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Woodford, P. Torr, I. D. Reid and A. Fitzgibbon, Global Stereo Reconstruction under Second Order Smoothness Priors, IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI), vol 31, no 12, 2009.

Charles Bibby and Ian Reid, Robust Real-Time Visual Tracking using Pixel-Wise Posteriors, Proceedings of the European Conference on Computer Vision (ECCV), 2008

Davison, I. D. Reid, N. Molton and O. Stasse, MonoSLAM: Real-time Single Camera SLAM, IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI), vol. 29, no. 6, pp 1052-1067, 2007.

Deutscher and I. D. Reid, Articulated body motion capture by stochastic search, International Journal of Computer Vision (IJCV), Vol. 61, No. 2, 2005.

H Rezatofighi, N Tsoi, JY Gwak, A Sadeghian, I Reid, S Savarese, Generalized intersection over union: A metric and a loss for bounding box regression. Proceedings of the IEEE/CVF conference on computer vision and pattern, 2019.

Criminisi, I. D. Reid and A. Zisserman, Single view metrology, International Journal of Computer Vision, vol. 40(2), pp 123-148, 2000.

Career

Prior to joining MBZUAI, Reid was Head of School and Professor of Computer Science at the University of Adelaide in Australia.

A fellow of the Australian Academy of Technological Sciences and Engineering (ATSE), the Australian Academy of Science (AAS) and a former Rhodes Scholar, Reid held an Australian Laureate Fellowship from 2013–2018 in recognition of his contribution to building Australia's internationally competitive research capacity. Reid was the Deputy Director of the Australian Centre for Robotic Vision from 2014–2021 and, in 2022, was awarded the Australian Computer Society's Artificial Intelligence Distinguished Researcher Award in recognition of his outstanding contributions to research in computer vision and machine learning.

During his career, Reid has secured more than US\$20 million in funding as principal investigator, has registered three patents, is supervising nine Ph.D. students currently and has successfully supervised 29 doctoral and three postgraduate students to completion.



Department of
Computer Vision



Fahad Khan

Deputy Department Chair
of Computer Vision and
Associate Professor of Computer Vision

Research interests

Khan's research interests include a wide range of topics within computer vision, including object recognition, detection, segmentation, tracking and action recognition. Dr. Khan's current research particularly focuses on learning visual recognition models with limited human supervision.

Education

- **Ph.D. in computer vision** from the Autonomous University of Barcelona, Spain
- **Master's in intelligent systems design** from Chalmers University of Technology, Sweden
- **Master's in artificial intelligence and computer vision** from the Autonomous University of Barcelona, Spain

Publishing

Khan has published more than 100 reviewed conference papers, journal articles, and book contributions, with more than 20,000 citations according to Google Scholar.

A. Gupta, S. Narayan, K. J. Joseph, S. Khan, FS. Khan, M. Shah. OW-DETR: Open-world Detection Transformer. CVPR 2022.

N. Ristea, R. Ionescu, K. Nasrollahi, FS. Khan, T. Moeslund, M. Shah. Self-Supervised Predictive Convolutional Attentive Block for Anomaly Detection. CVPR 2022.

K. J. Joseph, S. Khan, FS. Khan, V. Balasubramanian. Towards Open World Object Detection. CVPR 2021.

M. Danelljan, G. Bhat, FS. Khan, M. Felsberg. ATOM: Accurate Tracking by Overlap Maximization. CVPR 2019.

A. Acsintoae, A. Florescu, M. Georgescu, T. Mare, P. Sumedrea, R. Ionescu, FS. Khan, M. Shah. UBnormal: New Benchmark for Supervised Open-Set Video Anomaly Detection. CVPR 2022.

T. Wang, T. Yang, M. Danelljan, FS. Khan, X. Zhang, J. Sun. Learning Human-Object Interaction Detection Using Interaction Points. CVPR 2020.

Career

From 2012 to 2014, Khan was a postdoctoral fellow and then a research fellow (2014-2018) at Computer Vision Laboratory, Linköping University, Sweden.

In 2018, he was awarded the Docent title in computer vision from Linköping University, Sweden. Prior to joining MBZUAI, Khan was a lead scientist at the Inception Institute of Artificial Intelligence (IIAI), Abu Dhabi, United Arab Emirates.

Khan has achieved top ranks on various international challenges (Visual Object Tracking VOT: 1st 2014 and 2018, 2nd 2015, 1st 2016; VOT-TIR: 1st 2015 and 2016; OpenCV Tracking: 1st 2015; 1st PASCAL VOC Segmentation and Action Recognition tasks 2010). He received the best paper award in the computer vision track at IEEE ICPR 2016.

CV

Department of
Computer Vision



Abdulmotaleb El Saddik

Acting Department Chair
of Computer Vision and
Professor of Computer Vision

Research interests

El Saddik's research focus is on the establishment of digital twins to enhance the quality of life of citizens using artificial intelligence (AI), as well as multimedia computing and communications, and extended reality (XR) including haptics/AR/VR.

Education

- **Dr.-Ing. (Ph.D.) Electrical and computer engineering**, Darmstadt University of Technology, Germany
- **Dipl.-Ing. Electrical and computer engineering**, Darmstadt University of Technology, Germany

Publishing

El Saddik has co-authored 10 books and more than 600 publications and six U.S. patents, as well as chaired more than 50 conferences and workshops. El Saddik is the designated editor-in-chief of the ACM Transactions on Multimedia Computing, Communications and Applications (ACM TOMM), senior associate editor of IEEE Multimedia (IEEE MM), and guest editor for several transactions and journals. He has also received seven best paper awards.

Haptics Technologies: Bringing Touch to Multimedia (Springer), Abdulmotaleb El Saddik, Mauricio Orozco, Mohamad Eid, Jongeun Cha, 2011.

Multimodal fusion for multimedia analysis: a survey. PK Atrey, MA Hossain, A El Saddik, MS Kankanhalli *Multimedia systems* 16 (6), 345-379, 2010.

Digital twins: The convergence of multimedia technologies. A El Saddik, *IEEE MultiMedia* 25 (2), 87-92, 2018.

C2PS: A digital twin architecture reference model for the cloud-based cyber-physical systems, K. M. Alam and A. El Saddik, in *IEEE Access*, vol. 5, pp. 2050-2062, 2017, doi: 10.1109/ACCESS.2017.2657006.

Evaluating and improving the depth accuracy of Kinect for Windows v2. L Yang, L Zhang, H Dong, A Alelaiwi, A El Saddik. *IEEE Sensors Journal* 15 (8), 4275-4285, 2015.

Career

Before joining MBZUAI, El Saddik served as a distinguished university professor and university research chair in the School of Electrical Engineering and Computer Science at the University of Ottawa. He was the director of the Ottawa-Carleton Institute for Electrical and Computer Engineering (OCIECE) and the director of the Medical Devices Innovation Institute (MDII) and Director of the Information Technology Cluster, Ontario Research Network on Electronic Commerce (ORNEC).

El Saddik is a fellow of the Royal Society of Canada, and a fellow of IEEE, a fellow of the Canadian Academy of Engineering and a fellow of the Engineering Institute of Canada.

He is an ACM distinguished scientist and has received several awards, including the Friedrich Wilhelm Bessel Award from the German Humboldt Foundation, the IEEE Instrumentation and Measurement Society Technical Achievement Award. During his career, he has supervised more than 150 researchers.



Department of
Computer Vision



Hao Li

Associate Professor of Computer Vision
and **Director** of MBZUAI Metaverse Center

Research interests

Li's research focuses on novel deep learning and data-driven techniques for data capture and synthesis, advanced geometry processing and multi-modal algorithms, as well as the development of complex end-to-end systems for AR/VR applications and visual effects. He is particularly interested in human digitization (faces, hair, bodies, clothing), performance capture and motion synthesis, neural rendering (GANs, NeRFs, etc.), as well as AI-media synthesis, manipulation, and detection.

Education

- **Ph.D. in computer science** from ETH Zurich, Switzerland
- **Diploma (M.Sc.) in computer science** from Universität Karlsruhe, Germany

Publishing

Li's research involves the development of novel deep learning, data-driven, and geometry processing algorithms. He is known for his seminal work in avatar creation, facial animation, hair digitization, dynamic shape processing, as well as his recent efforts in AI media synthesis and deepfake detection.

Normalized avatar synthesis using stylegan and perceptual refinement. Huiwen Luo, Liwen Hu, Koki Nagano, Zejian Wang, Han-Wei Kung, Qingguo Xu, Lingyu Wei, Hao Li. Proceedings of the 34th IEEE International Conference on Computer Vision and Pattern 2021, 06/2021 – CVPR 2021

Monocular real-time volumetric performance capture. Ruilong Li, Yuliang Xiu, Shunsuke Saito, Zeng Huang, Kyle Olszewski, Hao Li. Proceedings of the 16th European Conference on Computer Vision 2020, 08/2020 – ECCV 2020

Learning to infer implicit surfaces without 3D supervision. Shichen Liu, Shunsuke Saito, Weikai Chen, Hao Li. Proceedings of the 33rd Conference on Neural Information Processing Systems 2019, 12/2019 – NeurIPS 2019

Softrasterizer: differentiable rendering for image-based 3D reasoning. Shichen Liu, Tianye Li, Weikai Chen, Hao Li. Proceedings of the IEEE International Conference on Computer Vision 2019, 10/2019 – ICCV 2019 (Oral Presentation)

PIFU: Pixel-aligned function for high-resolution clothed human digitization. Shunsuke Saito, Zeng Huang, Ryota Natsume, Shigeo Morishima, Angjoo Kanazawa, Hao Li. Proceedings of the IEEE International Conference on Computer Vision 2019, 10/2019 – ICCV 2019

Virtual human creator. Lingyu Wei, McLean Goldwhite, Zejian Wang, Huiwen Luo, Liwen Hu, Andy Spielberg, Brandon White, Katherine Lee, Aviral Agarwal, Anda Deng, Yen-Chun Chen, Jack Howard, Yuki Ikegami, Yudai Tamamura, Philip Scott, Kazuma Takahashi, Hao Li. SXSW 2022 Creative Industries Expo, Austin, 03/2022 – SXSW 2022 Lessons learned from large-scale, first-tier clinical exome sequencing in a highly consanguineous population. D Monies, M Abouelhoda, M Assoum, N Moghrabi, R Rafiullah, et al. The American Journal of Human Genetics 104 (6), 1182-1201, 2019.

Career

Li is CEO and co-founder of Pinscreen, a startup that builds cutting edge AI-driven virtual avatar technologies. He was previously a Distinguished Fellow of the Computer Vision Group at UC Berkeley and Associate Professor of Computer Science at the University of Southern California, where he was also director of the USC Institute for Creative Technologies.

Li works at the intersection between computer vision, computer graphics, and machine learning, with focus on virtual humans, reality capture, and AI synthesis. His goal is to enable new AI and immersive technologies that can make the concept of the metaverse possible, and enhance our lives with digital experiences that are otherwise not possible in the physical world.

Li was also a visiting professor at Weta Digital, a research lead at Industrial Light & Magic / Lucasfilm, and a postdoctoral fellow at Columbia and Princeton universities. Hao was speaker at the World Economic Forum in Davos in 2020 and exhibited at SXSW in 2022. His startup, Pinscreen, was recipient of the Epic Megagrants in 2021, and in 2022, Hao was featured in the first season of Amazon's documentary re:MARS Luminaries.



Department of
Computer Vision



Salman Khan

Associate Professor of Computer Vision

Research interests

Khan's research interests include computer vision and machine learning. He has been actively working on learning from limited data (zero and few-shot learning), adversarial robustness of deep neural networks and continual life-long learning systems for computer vision problems. The above-mentioned tasks can help us realize intelligent autonomous systems that can better understand the real-world for improved recognition, detection, segmentation, and detailed scene comprehension.

Education

- **Ph.D. in computer science** from the University of Western Australia, Australia (Honorable mention on Dean's list)

Publishing

Khan has published more than 80 papers in top scientific journals and conferences such as TPAMI, IJCV, CVPR, ICCV, ECCV, ICLR, NeurIPS, IJCAI, IROS and AAAI.

M. Naseer, K. Ranasinghe, S. H. Khan, M. Hayat, F. S. Khan, and M-H. Yang, "Intriguing Properties of Vision Transformers," *Advances in Neural Information Processing Systems, (NeurIPS), 2021. [Oral]*.

KJ Joseph, J. Rajasegaran, S. H. Khan, F. S. Khan, and V. Balasubramanian "Incremental Object Detection via Meta-learning," *IEEE Transactions on Pattern Analysis and Machine Intelligence, (TPAMI), IEEE, 2021.*

S. Ramasinghe, K. Ranasinghe, S. Khan, N. Barnes and S. Gould "Conditional Generative Modeling via Learning the Latent Space," *9th International Conference on Learning Representations, (ICLR), 2021.*

S. H. Khan, M. Hayat, S. W. Zamir, J. Shen and L. Shao, "Striking the Right Balance with Uncertainty," *IEEE Conference on Computer Vision and Pattern Recognition, (CVPR), Long Beach, US, 2019. [Oral]*.

S. H. Khan, M. Hayat, M. Bennamoun, F. Sohel and R. Togneri, "Cost Sensitive Learning of Deep Feature Representations from Imbalanced Data," *IEEE Transactions on Neural Networks and Learning Systems (TNNLS), 2017.*

Career

Prior to joining MBZUAI, Khan was a senior scientist with the Inception Institute of Artificial Intelligence (2018-2020), and an honorary lecturer with Australian National University (ANU) since 2016. Previous roles include working as a research scientist with Data61-CSIRO from 2016-2018, and visiting researcher with National ICT Australia (NICTA), CRL, in 2015.

Khan acted as an investigator on several competitive research grants funded by government and commercial entities. Khan has also acted as a referee for international grant agencies such as the Australian and European Research Council (ARC and ERC), and IEEE Chair for Computer Society.

Khan is a recipient of several prestigious scholarships, including Fulbright and IPRS, and served as a program committee member for several premier conferences where he has won multiple outstanding reviewer awards. He was the guest editor for IEEE TPAMI and an area chair for IEEE CVPR 2022. He, alongside his collaborators, won the best paper award in ICPRAM 2020, and top ranks in CVPR-NTIRE 2019 and 2021 challenges on image enhancement.



Department of
Computer Vision



Karthik Nandakumar

Associate Professor of Computer Vision

Research interests

Nandakumar's primary research interests include computer vision, machine learning, biometric recognition, applied cryptography, and blockchain. Specifically, he is interested in research related to the development of secure, privacy-preserving, and trustworthy AI systems, robust collaborative learning algorithms for healthcare applications, and efficient machine learning algorithms for predictive maintenance in the energy sector.

Education

- **Ph.D. in computer science** from Michigan State University, USA.
- **Master's degree in computer science** from Michigan State University, USA.
- **Master's degree in statistics** from Michigan State University, USA.
- **Master's degree in management of technology** from the National University of Singapore, Singapore.
- **Bachelor of Engineering** from Anna University, India.

Publishing

Nandakumar has co-authored two books titled Introduction to Biometrics (Springer, 2011) and Handbook of Multibiometrics (Springer, 2006). He has been awarded 15 US patents and another six patent applications are under review.

Aremu and K. Nandakumar, "PolyKervNets: Activation-free Neural Networks for Efficient Private Inference", at IEEE Conference on Secure and Trustworthy Machine Learning (SaTML), February 2023

Hashim, K. Nandakumar, and M. Yaqub, "Self-omics: A Self-supervised Learning Framework for Multi-omics Cancer Data", at Pacific Symposium on Biocomputing, January 2023

Nazarov, M. Yaqub, and K. Nandakumar, "On the Importance of Image Encoding in Automated Chest X-Ray Report Generation", at British Machine Vision Conference (BMVC), November 2022

Almalik, M. Yaqub, and K. Nandakumar, "Self-Ensembling Vision Transformer (SEViT) for Robust Medical Image Classification", at 25th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), September 2022

Alkhunaizi, D. Kamzolov, M. Takáč, and K. Nandakumar, "Suppressing Poisoning Attacks on Federated Learning for Medical Imaging", at 25th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), September 2022

Lyu, Y. Li, K. Nandakumar, J. Yu and X. Ma, "How to Democratise and Protect AI: Fair and Differentially Private Decentralised Deep Learning", in IEEE Transactions on Dependable and Secure Computing, vol. 19, no. 02, pp. 1003-1017, 2022

Career

Prior to joining MBZUAI, Nandakumar was a research staff member at IBM Research – Singapore from 2014 to 2020 and a scientist at the Institute for Infocomm Research, A*STAR, Singapore from 2008 to 2014.

Nandakumar has received several awards including the 2008 Fitch H. Beach Outstanding Graduate Research Award from the College of Engineering at Michigan State University, the Best Paper Award from the Pattern Recognition journal (2005), the Best Scientific Paper Award (Biometrics Track) at ICPR 2008, and the 2010 IEEE Signal Processing Society Young Author Best Paper Award. He is a senior member of the IEEE.



Department of
Computer Vision



Mohammad Yaqub

Associate Professor of Computer Vision

Research interests

Yaqub's research interest is in AI in healthcare applied to problems in medical image analysis (e.g, ultrasound, MRI and CT), radiomics and radiogenomics. He investigates and develops AI algorithms to solve real-world healthcare problems, explores fundamental machine learning methods such as continual learning and adversarial attacks and defense in the healthcare domain, and studies different healthcare challenges using natural language processing.

Education

- **Ph.D. in biomedical engineering** from the University of Oxford, United Kingdom.

Publishing

Yaqub has published more than 40 peer-reviewed articles in top conferences and journals such as IEEE TMI, Medical Image Analysis, MICCAI and Ultrasound in Medicine and Biology and co-edited two books entitled: Medical Imaging Understanding and Analysis, 2020 and 2021.

M Z Atwany, A H Sahyoun and M Yaqub, "Deep Learning Techniques For Diabetic Retinopathy Classification: A Survey," in IEEE Access, 2022, doi: 10.1109/ACCESS.2022.3157632. [Impact factor: 3.367].

M Yaqub, B Kelly, JA Noble, AT Papageorghiou. The effect of maternal body mass index on fetal ultrasound image quality. Am J Obstet Gynecol. Published online April 2021.doi:10.1016/j.ajog.2021.04.248. [Impact factor: 6.502].

N Saeed, S E Hardan, K Abutalip, M Yaqub, Is it Possible to Predict MGMT Promoter Methylation from Brain Tumor MRI Scans using Deep Learning Models? In Medical Imaging with Deep Learning Conference, 2022.

I Sobirov, O Nazarov, H Alasmawi, M Yaqub, Automatic Segmentation of Head and Neck Tumor: How Powerful Transformers Are? In Medical Imaging with Deep Learning Conference, 2022.

N Saeed, R Al Majzoub, I Sobirov, M Yaqub, An Ensemble Approach for Patient Prognosis of Head and Neck Tumor Using Multimodal Data, HECTOK Challenge, MICCAI 2021.

S Srivastava, M Yaqub, K Nandakumar, Z Ge, D Mahapatra. Continual Domain Incremental Learning for Chest X-Ray Classification in Low-Resource Clinical Settings. In Domain Adaptation and Representation. Transfer, and Affordable Healthcare and AI for Resource.

Diverse Global Health (pp. 226–238), 2021. Springer.

Career

Prior to joining MBZUAI, Yaqub was a postdoctoral fellow for six years in the Institute of Biomedical Engineering at the University of Oxford where he worked on several medical imaging problems.

Yaqub spent more than seven years in industry working as a consultant followed by a full position as vice president of engineering at Intelligent Ultrasound Limited, Oxfordshire, United Kingdom.

Yaqub has also worked as a lecturer at Oxford EMI Training and the IT Learning Centre, University of Oxford. In addition to his full-time position at MBZUAI, Yaqub is a visiting fellow in the Nuffield Department of Clinical Neurosciences and the Oxford Acute Vascular Imaging Centre, University of Oxford, Oxford, United Kingdom.

CVDepartment of
Computer Vision**Rao Muhammad Anwer****Assistant Professor** of Computer Vision

Research interests

Anwer's research interests are in visual object recognition, pedestrian detection and action recognition, efficient and robust deep learning models for comprehensive scene understanding, and human visual relationship detection. Current projects he is working on include: (1) Toward integrated and detailed image understanding; and (2) Learning visual recognition models with limited human supervision.

Education

- **Ph.D. in computer vision** from the Autonomous University of Barcelona, Spain.
- **Master's degree in intelligent systems design** from the Chalmers University of Technology, Sweden.

Publishing

Anwer has authored or co-authored more than 45 academic publications in the International Journal of Biological and Medical Sciences, the Proceedings of IEEE, and others, and has been cited more than 1500 times.

“Spatio-temporal Relation Modeling for Few-shot Action Recognition”: Anirudh Thatipelli, Sanath Narayan, Salman Khan, Rao Muhammad Anwer, Fahad Shahbaz Khan, Bernard Ghanem, CVPR 2022.

“PSTR: End-to-End One-Step Person Search with Transformers”: Jiale Cao, Yanwei Pang, Rao Muhammad Anwer, Hisham Cholakkal, Jin Xie, Mubarak Shah, Fahad Shahbaz Khan, CVPR 2022.

“Energy-based Latent Aligner for Incremental Learning”: Joseph K J, Salman Khan, Fahad Shahbaz Khan, Rao Muhammad Anwer, Vineeth N Balasubramanian, CVPR 2022.

“Handwriting Transformer”: Ankan Kumar Bhunia, Salman Khan, Hisham Cholakkal, Rao Muhammad Anwer, Fahad Shahbaz Khan, Mubarak Shah, ICCV 2021.

“Sipmask: Spatial information preservation for fast image video instance segmentation”: Jiale Cao, Rao Muhammad Anwer, Hisham Cholakkal, Fahad Shahbaz Khan, Yanwei Pang, Ling Shao, ECCV 2020.

“Deep contextual attention for human-object interaction detections”: Tiancai Wang, Rao Muhammad Anwer, Muhammad Haris Khan, Fahad Shahbaz Khan, Yanwei Pang, Ling Shao, Jorma Laaksonen, ICCV 2019.

Career

Prior to joining MBZUAI, Anwer was at Inception Institute of Artificial Intelligence (IIAI) in Abu Dhabi, United Arab Emirates working as a research scientist.

Before joining IIAI, he was a postdoctoral research fellow with Aalto University, Finland from 2014 to 2018.



Department of
Computer Vision



Hisham Cholakkal

Assistant Professor of Computer Vision

Research interests

Cholakkal's research aims at developing solutions that are well-aligned with real-world applications and is focused on four areas within computer vision: visual recognition; person-centric scene understanding; learning from limited supervision; and image generation. His recent research interests include object detection; image and video segmentation; object counting; image classification; pedestrian detection; person search; human-pose estimation; human-object interaction detection; activity recognition; crowd counting; few-shot/zero-shot learning; weakly supervised learning; AI for style imitation and AI for creativity.

Education

- **Ph.D. in computer vision** (Computer Vision) from Nanyang Technological University (NTU), Singapore.
- **Master's degree (M.Tech) in signal processing** from the Indian Institute of Technology (IIT), India.

Publishing

Cholakkal has published papers in top scientific journals and conferences such as TPAMI, CVPR, ICCV, ECCV and AAAI.

H. Cholakkal, G. Sun, S. Khan, FS. Khan, L. Shao, L.V Gool, "Towards Partial. Supervision for Generic Object Counting in Natural Scenes", in IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2022.

J. Cao, RM. Anwer, H. Cholakkal, FS. Khan, Y Pang, and L. Shao, "SipMask: Spatial Information Preservation for Fast Image and Video Instance Segmentation", in Proceedings of the European Conference on Computer Vision (ECCV), 2020.

J. Cao, Y. Pang, RM. Anwer, H. Cholakkal, J. Xie, M. Shah, FS. Khan, "PSTR: End-to-End One-Step Person Search With Transformers," in Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2022.

J. Xie, H. Cholakkal, RM. Anwer, FS. Khan, Y Pang, L. Shao, and M. Shah, "Count-and Similarity-aware R-CNN for Pedestrian Detection", in Proceedings of the European Conference on Computer Vision (ECCV), 2020.

S Narayan, H Cholakkal, M Hayat, FS Khan, MH Yang, L Shao, "D2-Net: Weakly-Supervised Action Localization via Discriminative Embeddings and Denoised Activations", in Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV), 2021.

AK Bhunia, S Khan, H Cholakkal, RM Anwer, FS Khan, M Shah, "Handwriting Transformers", in Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV), 2021.

Career

Cholakkal has diverse experiences across fundamental research, teaching, and product development at industry. He has several years of experience in leading research teams involved in commercial and fundamental research. Prior to joining MBZUAI, he worked as a research scientist at the Inception Institute of Artificial Intelligence (IIAI) in Abu Dhabi.

Before joining IIAI, he was a senior technical lead in the Computer Vision and Deep Learning Research team at Mercedes-Benz R and D, India. He has also worked as a researcher at BEL-Central Research Lab, India and Advanced Digital Sciences Center, Singapore.

In addition to authoring top-tier research articles and patents, he developed several computer vision frameworks that are successfully released as commercial products in various industries. He has served as a program committee member for several top conferences including CVPR, ICCV, NeurIPS, ICLR and ECCV.



Department of
Computer Vision



Muhammad Haris Khan

Assistant Professor of Computer Vision

Research interests

Khan's research interests span active topics in computer vision, including face-related tasks, visual domain adaptation and generalization, and visual tracking. He is also interested in unsupervised learning for instance-level to dense prediction tasks to leverage vast amounts of unlabeled data and human-object interaction detection tasks for a deeper understanding of human behaviors.

Education

- **Ph.D. in computer vision** University of Nottingham (UoN), United Kingdom.
- **Master's in embedded digital systems** from University of Sussex, United Kingdom

Publishing

Khan has authored and co-authored several papers in top-ranked computer vision conferences. His overall peer-reviewed research has more than 2700 citations.

Muhammad Zaigham Zaheer, Arif Mehmood, Muhammad Haris Khan, Mattia Segu, Fisher Yu, Seung-Ik Lee, "Generative Cooperative Learning for Unsupervised Video Anomaly Detection". Accepted at IEEE/CVF (CVPR) 2022.

Muhammad Saad Saeed, Muhammad Haris Khan, Shah Nawaz, Muhammad Haroon Yousaf, Alessio Del Bue, "Fusion and Orthogonal Projection for Improved Face-Voice Association", Accepted at IEEE ICASSP 2022.

Muhammad Akhtar Munir, Muhammad Haris Khan, Muhammad Saquib Sarfraz, Mohsen Ali, "Synergizing between Self-Training and Adversarial Learning for Domain Adaptive Object Detection", Proc. NeurIPS 2021.

Muhammad Haris Khan, Talha Zaidi, Salman Khan, Fahad Shahbaz Khan, "Mode-Guided Feature Augmentation for Domain Generalization", Proc. BMVC 2021.

Muhammad Haris Khan, John McDonagh, Salman Khan, Muhammad Shahabuddin, Aditya Arora, Fahad Shahbaz Khan, Ling Shao, and Georgios Tzimiropoulos, "AnimalWeb: A Large-Scale Hierarchical Dataset of Annotated Animal Faces". Proc. IEEE/CVF (CVPR) 2020.

Tiancai Wang, Rao Muhammad Anwer, Muhammad Haris Khan, Fahad Shahbaz Khan, Yanwei Pang, Ling Shao, Jorma Laaksonen, "Deep Contextual Attention for Human-Object Interaction Detection", Proc. ICCV 2019.

Career

Prior to MBZUAI, Khan was a research scientist in the Inception Institute of Artificial Intelligence (IIAI), UAE.

Before joining IIAI, he served as an assistant professor at Comsats University Islamabad (CUI), Pakistan for two years. Earlier, he was a postdoctoral fellow at the University of Nottingham (UoN), United Kingdom for 1.5 years.

Prior to starting his Ph.D., he also served as a lecturer for three years at CUI, Pakistan. He is a recipient of the International Research Excellence Scholarship for his doctoral study.



Department of
Computer Vision



Xiaojun Chang

Visiting Professor of Computer Vision

Research interests

Chang's research interests include developing structured machine learning models for computer vision and multimedia tasks such as video analysis, multi-agent reinforcement learning and vision-language grounding.

Education

- **Postdoc in artificial intelligence** from Carnegie Mellon University, USA
- **Ph.D. in computer science** from the University of Technology Sydney, Australia
- **Master's in computer science** from Northwest University, China
- **Bachelor's in physics** from Northwest University, China

Publishing

Published in more than 150 international peer-reviewed journals, Chang's papers have garnered more than 12,000 citations on Google Scholar and 16 have been recognized as ESI Hot and Highly Cited Papers. He serves as Associate Editor for several international journals including IEEE Transactions on Circuits and Systems for Video Technology and ACM Transactions on Multimedia Computing, Communications, and Applications.

Mingjie Li, Poyao Huang, Xiaojun Chang*, Junjie Hu, Yi Yang and Alex Hauptmann. Video Pivoting Unsupervised Multi-modal Machine Translation. IEEE Trans. Pattern Anal. Mach. Intell. 45(3):3918-3932 (2023).

Lingling Zhang, Xiaojun Chang*, Jun Liu, Minnan Luo, Zhihui Li, Lina Yao, and Alex Hauptmann. TN-ZSTAD: Transferable Network for Zero-Shot Temporal Activity Detection. IEEE Trans. Pattern Anal. Mach. Intell. 45(3):3848-3861 (2023).

Xiaojun Chang, Pengzhen Ren, Pengfei Xu, Zhihui Li, Xiaojiang Chen and Alex Hauptmann. A Comprehensive Survey of Scene Graphs: Generation and Application. IEEE Trans. Pattern Anal. Mach. Intell. 45(1):1-26 (2023).

Caixia Yan, Xiaojun Chang*, Zhihui Li, Weili Guan, Zongyuan Ge, Lei Zhu and Qinghua Zheng. ZeroNAS: Differentiable Generative Adversarial Networks Search for Zero-Shot Learning. IEEE Trans. Pattern Anal. Mach. Intell. 44(12):9733-9740 (2022).

Changlin Li, Guangrun Wang, Xiaodan Liang, Zhihui Li, and Xiaojun Chang*. DS-Net++: Dynamic Weight Slicing for Efficient Inference in CNNs and Vision Transformers. IEEE Trans. Pattern Anal. Mach. Intell. 45(4): 4430-4446 (2023).

Mingjie Li, Wenjia Cai, Karin Verspoor, Shirui Pan, Xiaodan Liang, Xiaojun Chang: Cross-modal Clinical Graph Transformer for Ophthalmic Report Generation. CVPR 2022: 20624-20633.

Career

Chang has joined MBZUAI as a Visiting Professor of Computer Vision. He is a tenured professor at the Faculty of Engineering and Information Technology and Director of the Recognition, Learning, and Reasoning Lab (ReLER) at the Australian Artificial Intelligence Institute, University of Technology Sydney, Australia. A recipient of a Discovery Early Career Researcher Award (DECRA) from the Australian Research Council, Chang has led 11 national-level projects.



Department of
Computer Vision



Ivan Laptev

Visiting Professor of Computer Vision

Research interests

Laptev is most known for his work on action recognition in video. More generally, he is interested in learning visual and visuomotor representations for understanding, navigation and manipulation of dynamic scenes. In particular, his research has explored large-scale learning using language in the form of video scripts and narrations as a source of readily available, but noisy supervision. He has addressed a range of problems in visual recognition including image and video classification and retrieval, video question answering, video captioning as well 3D reconstruction of human bodies, hands and manipulated objects. More recently, he has explored the convergence of computer vision, natural language processing and robotics, addressing the problems of vision-language navigation and vision-language manipulation.

Education

- **Postdoc in computer vision** from INRIA, Rennes, France
- **Ph.D. in computer vision** from Royal Institute of Technology (KTH), Stockholm
- **M.Sc. in computer science** from Royal Institute of Technology (KTH), Stockholm

Publishing

Published in more than 150 international peer-reviewed journals, Chang's papers have garnered more than 12,000 citations on Google Scholar and 16 have been recognized as ESI Hot and Highly Cited Papers. He serves as Associate Editor for several international journals including IEEE Transactions on Circuits and Systems for Video Technology and ACM Transactions on Multimedia Computing, Communications, and Applications.

Mingjie Li, Poyao Huang, Xiaojun Chang*, Junjie Hu, Yi Yang and Alex Hauptmann. Video Pivoting Unsupervised Multi-modal Machine Translation. IEEE Trans. Pattern Anal. Mach. Intell. 45(3):3918-3932 (2023).

Lingling Zhang, Xiaojun Chang*, Jun Liu, Minnan Luo, Zhihui Li, Lina Yao, and Alex Hauptmann. TN-ZSTAD: Transferable Network for Zero-Shot Temporal Activity Detection. IEEE Trans. Pattern Anal. Mach. Intell. 45(3):3848-3861 (2023).

Xiaojun Chang, Pengzhen Ren, Pengfei Xu, Zhihui Li, Xiaojiang Chen and Alex Hauptmann. A Comprehensive Survey of Scene Graphs: Generation and Application. IEEE Trans. Pattern Anal. Mach. Intell. 45(1):1-26 (2023).

Caixia Yan, Xiaojun Chang*, Zhihui Li, Weili Guan, Zongyuan Ge, Lei Zhu and Qinghua Zheng. ZeroNAS: Differentiable Generative Adversarial Networks Search for Zero-Shot Learning. IEEE Trans. Pattern Anal. Mach. Intell. 44(12):9733-9740 (2022).

Changlin Li, Guangrun Wang, Xiaodan Liang, Zhihui Li, and Xiaojun Chang*. DS-Net++: Dynamic Weight Slicing for Efficient Inference in CNNs and Vision Transformers. IEEE Trans. Pattern Anal. Mach. Intell. 45(4): 4430-4446 (2023).

Mingjie Li, Wenjia Cai, Karin Verspoor, Shirui Pan, Xiaodan Liang, Xiaojun Chang: Cross-modal Clinical Graph Transformer for Ophthalmic Report Generation. CVPR 2022: 20624-20633.

Career

Ivan Laptev obtained his master's degree in computer science at the Royal Institute of Technology (KTH) in Sweden in 1997 and then worked as a research assistant at the Technical University of Munich. In 2004, he earned his Ph.D. in computer science from KTH and pursued a postdoc position at the INRIA Vista team in France. He was appointed as INRIA Research Scientist in 2005 and then as INRIA Research Director in 2013. He has been with INRIA Paris since 2009, where he has led the WILLOW research team between 2021 and 2023.

He has published more than 150 technical papers, most of which appeared in international journals and major peer-reviewed conferences of computer vision, machine learning and robotics. He has graduated 19 Ph.D. students who now pursue careers in industrial and academic research labs. Ivan has also co-founded a computer vision company, VisionLabs, which has grown to 250 people.

Ivan has been actively involved in the scientific community, serving as an associate editor of IJCV and TPAMI, and as a program chair for CVPR 2018, ICCV 2023 and ACCV 2024. He will also serve as a General Chair of ICCV 2029 bringing the international computer vision community to UAE.

He has co-organized several tutorials, workshops and challenges at major computer vision conferences. He has also co-organized a series of INRIA summer schools on computer vision and machine learning (2010–2013) and Machines Can See summits (2017–2023). He received an ERC Starting Grant in 2012 and was awarded a Helmholtz prize for significant impact on computer vision in 2017.



Department of
Computer Vision



Xiaodan Liang

Visiting Associate Professor
of Computer Vision

Research interests

Liang's research is focused on developing interpretable and explainable neural-symbolic reasoning techniques for boosting vision and cross-modal understanding tasks (open-world detection/segmentation, robotic interaction and digital human) which will provide trustworthy and robust systems for real-world applications.

Education

- **Ph.D. in computer science and technology**
from the Carnegie Mellon University, USA
- **Bachelor in electronics and science and technology**
from Sun Yat-sen University, China

Publishing

Liang has published more than 80 cutting-edge papers which have appeared in the most prestigious journals and conferences in the field - Google Citation 15,000+.

Xiaodan Liang, Si Liu, Xiaohui Shen, Jianchao Yang, Luoqi Liu, Jian Dong, Liang Lin, Shuicheng Yan. Deep Human Parsing with Active Template Regression. *IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)*, Volume 37, Issue 12, 2015.

Xiaodan Liang, Yunchao Wei, Xiaohui Shen, Jianchao Yang, Liang Lin, Shuicheng Yan. Proposal-free Network for Instance-level Object Segmentation. *IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)*, Accepted 2017

Xiaodan Liang, Yunchao Wei, YunPeng Chen, Jianchao Yang, Liang Lin, Shuicheng Yan. Learning to Segment Human by Watching YouTube. *IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)*, 39(7): 1462-1468, 2017.

Xiaodan Liang, Chunyan Xu, Xiaohui Shen, Jianchao Yang, Jinhui Tang, Liang Lin, Shuicheng Yan. Human Parsing with Contextualized Convolutional Neural Network. *IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)*, 39(1): 115-127, 2017.

Xiaodan Liang, Liang Lin, Qingxing Cao, Rui Huang, and Yongtian Wang. Recognizing Focal Liver Lesions in CEUS with Dynamically Trained Latent Structured Models. *IEEE Transactions on Medical Imaging (T-MI)*, 35(3): 713-727, 2016.

Xiaodan Liang, Liang Lin, Wei Yang, Ping Luo, Junshi Huang, and Shuicheng Yan. Clothes Co-Parsing via Joint Image Segmentation and Labeling with Application to Clothing Retrieval. *IEEE Transactions on Multimedia (T-MM)*, 18(6): 1175-1186, 2016.

Career

Liang joins MBZUAI from Sun Yat-sen University where she is an associate professor at the School of Intelligent Systems Engineering. Previously, she was a project scientist at Carnegie Mellon University, working with Professor Eric Xing.

Liang served as area chair of ICCV 2019, CVPR 2020, NeurIPS 2021-2022, WACV 2021, Tutorial Chair (Organization committee) of CVPR 2021, and Ombud Committee of CVPR 2023. She has been awarded the ACM China and CCF Best Doctoral Dissertation Award, the Alibaba DAMO Academy Young Fellow (Top 10 under 35 in China), and the ACL 2019 Best Demo paper nomination.

She is named one of the young innovators 30 under 30 by Forbes (China). She and her collaborators have also published the largest human parsing dataset to advance the research on human understanding, and successfully organized four workshops and challenges on CVPR 2017, CVPR 2018, CVPR 2019, CVPR 2020. She also organized ICML 2019 and ICLR 2021 workshops respectively.



Department of
Computer Vision



Shahrukh Hashmi

Adjunct Associate Professor
of Computer Vision

Research interests

Hashmi's research interests include premature aging, GVHD, Healthcare IoTs, the Metaverse, and Blockchains. He is also involved in stem cell therapeutics, particularly in regenerative hematology.

Education

- **4BMT Fellowship - Blood and Marrow Transplant Program**
at James P. Wilmot Cancer Center, University of Rochester Medical Center, USA
- **Fellow** - Hematology/Oncology, Strong Memorial Hospital, University of Rochester Medical Center.
- **Resident - Combined Preventive/Internal Medicine Program** at Griffin Hospital, USA
- **Master's - Public Health;** - Division of Chronic Disease Epidemiology, Yale School of Public Health.
- **MBBS - Medical Education** - Baqai Medical University, Undergraduate Studies.
- **Fellow of Science (undergraduate)** - DHA College for Men, Pakistan.

Publishing

Hashmi has authored more than 200 articles in peer-reviewed journals, including in JAMA, Lancet, and in NEJM.

Senolytics in idiopathic pulmonary fibrosis: results from a first-in-human, open-label, pilot study

JN Justice, AM Nambiar, T Tchkonja, NK LeBrasseur, R Pascual, et al. EBioMedicine 40, 554-563, 2019.

Senolytics decrease senescent cells in humans: Preliminary report from a clinical trial of Dasatinib plus Quercetin in individuals with diabetic kidney disease. LTJ Hickson, LGPL Prata, SA Bobart, TK Evans, N Giorgadze, SK Hashmi, et al. EBioMedicine 47, 446-456, 2019.

Survival after mesenchymal stromal cell therapy steroid-refractory acute graft-versus-host disease: systematic review and meta-analysis. S Hashmi, M Ahmed, MH Murad, MR Litzow, RH Adams, LM Ball, et al. The Lancet Haematology 3 (1), e45-e52, 2016.

Increasing use of allogeneic hematopoietic cell transplantation in patients aged 70 years and older in the United States. L Muffly, MC Pasquini, M Martens, R Brazauskas, X Zhu, K Adekola, et al. Blood, The Journal of the American Society of Hematology 130 (9), 1156-1164, 2017.

Lessons learned from large-scale, first-tier clinical exome sequencing in a highly consanguineous population. D Monies, M Abouelhoda, M Assoum, N Moghrabi, R Rafiullah, et al. The American Journal of Human Genetics 104 (6), 1182-1201, 2019.

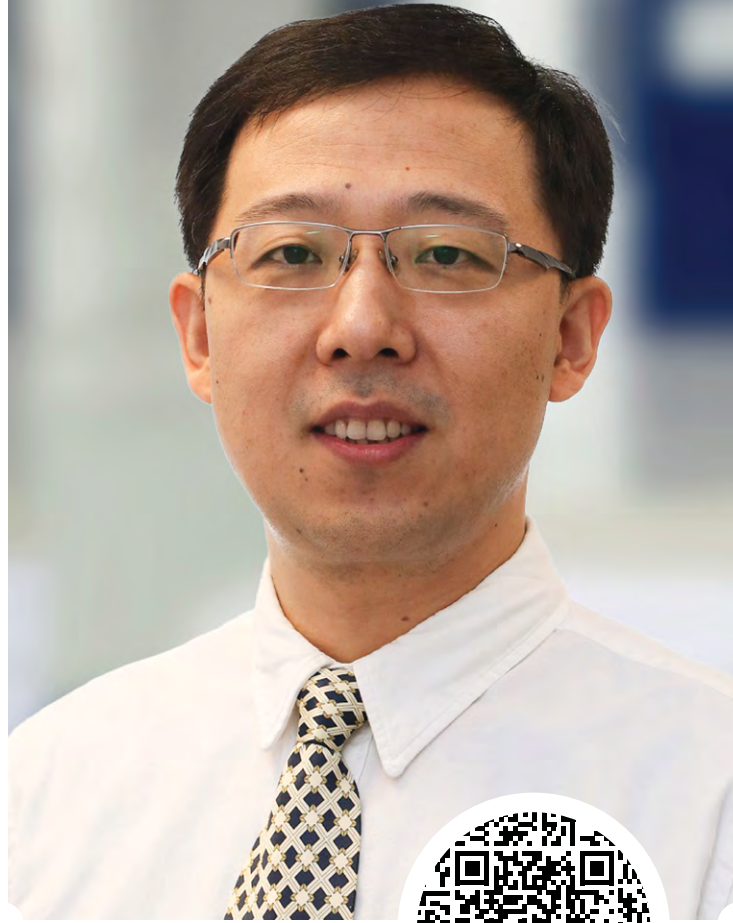
Career

Hashmi has been at Mayo Clinic for approximately 10 years. He started Mayo Clinic's first BMT survivorship program. He has served as PI or Co-PI on many industry-sponsored and NIH-sponsored trials.

Hashmi chairs many national or international professional committees/groups including being the chair of the Worldwide Network for Blood and Marrow Transplant's Nuclear Accident committee (Geneva, Switzerland), founding chair of American Society for Blood and Marrow Transplant Society's Survivorship SIG (Chicago, Illinois), and co-chair of the Center for International Blood and Marrow Transplant Registry's (CIBMTR) Health Services Committee (Milwaukee, Wisconsin). He is currently the chair of the Department of Hematology/Oncology at the SSMC, Abu Dhabi, UAE; and the chair of SEHA Oncology Council.

CV

Department of
Computer Vision



Shijian Lu

Adjunct Associate Professor
of Computer Vision

Research interests

Lu's research focuses on computer vision and sensing, image and video analytics, and deep learning. He has been working on scene text detection and recognition for years, contributing to a number of impactful benchmarking datasets as well as innovative detection and recognition techniques. In recent years, Lu has been studying how to tackle data collection and data annotation challenges in deep network training.

Education

- **Ph.D. in electrical and computer engineering** from the National University of Singapore, Singapore.
- **Master's degree in electrical engineering** from the Xi'an Jiaotong University, China.

Publishing

Lu has authored or co-authored more than 200 academic papers, and has filed up to 10 patents in the US and EU. His developed technology has been successfully licensed to industry and deployed in daily operations.

Guan, D., Huang, J., Xiao, A., & Lu, S. (2022). Unbiased subclass regularization for semi-supervised semantic segmentation. CVPR

Zhan, F. Z., Zhang, J., Yu, Y., Wu, R., & Lu, S. (2022). Modulated contrast for versatile image translation. CVPR.

Zhang, G., Luo, Z., Yu, Y., Cui, K., & Lu, S. (2022). Accelerating DETR convergence via semantic-aligned matching. CVPR.

Zhang, J., Huang, J., Tian, Z. T., & Lu, S. (2022). Spectral unsupervised domain adaptation for visual recognition. CVPR.

Zhou, C., Luo, Z. L., Luo, Y., Liu, T., Pan, L., Cai, Z., Zhao, H., & Lu, S. (2022). PTTR: Relational 3d point cloud object tracking with transformer. CVPR.

Xue, C., Tian, Z., Zhan, F., Lu, S., & Bai, S. (2022). Fourier document restoration for robust document dewarping and recognition. CVPR.

Career

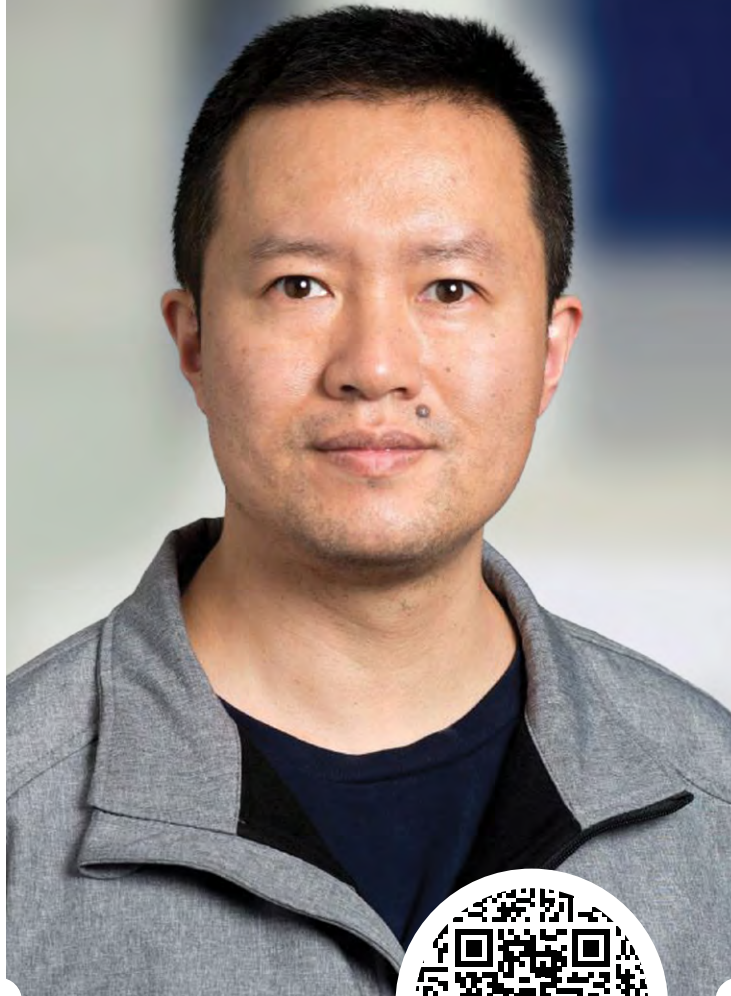
Lu is currently an associate professor (tenured) in the School of Computer Science and Engineering, Nanyang Technological University (NTU). He has held an adjunct position at MBZUAI since late 2021.

Before joining NTU in 2017, he took a number of leadership roles in the Institute for Infocomm Research (I2R), Agency for Science, Technology, and Research (A*STAR) in Singapore, including head of the Visual Attention Lab, deputy head of the Satellite Department, co-chair of the Image and Pervasive Access Laboratory (a CNRS overseas laboratory hosted by A*STAR in Singapore).

Lu's research focuses on computer vision and sensing, image and video analytics, and deep learning. He won a number of international benchmarking competitions such as DIBCO2009, H-DIBCO2010, DIBCO2013, RRC2013, ANWRESH-2014, etc.



Department of
Computer Vision



Min Xu

Affiliated Associate Professor
of Computer Vision

Research interests

Xu's research areas of interest include cryo-electron tomography (Cryo-ET) analysis, and biomedical image analysis.

Education

- **Ph.D. in computational biology and bioinformatics** from University of Southern California (USC), USA.
- **Master's of Science** from the School of Computing at the National University of Singapore, Singapore.
- **Master's of Arts in applied mathematics** from the University of Southern California (USC), USA.
- **Bachelor of Engineering in computer science** from the Beihang University, China.

Publishing

Xu has published more than 70 research papers in prestigious peer-reviewed conferences and journals, such as CVPR, ICCV, AAAI, ISMB, MICCAI, PNAS, Bioinformatics, PLOS Computational Biology, Structure, and JSB.daily operations.

Uddin M, Howe G, Zeng X, Xu M. Harmony: A Generic Unsupervised Approach for Disentangling Semantic Content from Parameterized Transformations. IEEE conference on computer vision and pattern recognition (CVPR 2022).

Wang T, Li X, Yang P, Hu G, Zeng X, Huang S, Xu C, Xu M. Boosting Active Learning via Improving Test Performance. AAAI Conference on Artificial Intelligence. (AAAI 2022) arXiv:2112.05683

Zeng X, Howe G, Xu M. End-to-end robust joint unsupervised image alignment and clustering. International Conference on Computer Vision (ICCV 2021).

Zhu X, Chen J, Zeng X, Liang J, Li C, Liu S, Behpour S, Xu M. Weakly Supervised 3D Semantic Segmentation Using Cross-Image Consensus and Inter-Voxel Affinity Relations. International Conference on Computer Vision (ICCV 2021).

Du X, Wang H, Zhu Z, Zeng X, Chang Y, Zhang J, Xu M. Active learning to classify macromolecular structures in situ for less supervision in cryo-electron tomography. Bioinformatics. doi:10.1093/bioinformatics/btab123 arXiv:2102.12040

Zeng X, Xu M. Gum-Net: Unsupervised geometric matching for fast and accurate 3D subtomogram image alignment and averaging. IEEE conference on computer vision and pattern recognition (CVPR 2020).

Career

Xu's career has centered on developing AI methods for the analysis of biomedical images and other biomedical data, in particular, Cellular Cryo-Electron Tomography (Cryo-ET) 3D image data. He is currently also an Assistant Professor at the Computational Biology Department within the School of Computer Science at Carnegie Mellon University, USA. He was a postdoctoral researcher at USC. He is a recipient of USA NIH and NSF awards.



Department of
Machine Learning



Kun Zhang

Acting Chair of Machine Learning,
Visiting Professor of Machine Learning, and
Director of Center for Integrative Artificial Intelligence (CIAI)

Research interests

Zhang's research interests lie in machine learning and artificial intelligence, especially in causal discovery and inference, causal representation learning, and machine learning under data heterogeneity. He aims to make causal learning and reasoning transparent in science, AI systems, and human society. On the application side, he is interested in biology, neuroscience, computer vision, computational finance, and climate analysis. His research has been motivated by real problems in healthcare, biology, neuroscience, computer vision, computational finance, and climate analysis.

Education

- **Senior research scientist** at the Max-Planck Institute for Intelligent Systems, Germany.
- **Postdoctoral fellow** at the University of Helsinki, Finland.
- **Ph.D. in computer science** from the Chinese University of Hong Kong.
- **Bachelor of Science in automation** from the University of Science and Technology of China, China.

Publishing

Zhang co-authored a best student paper at UAI 2010, received the best benchmark award of the causality challenge 2008, and co-authored a best paper finalist paper at CVPR 2019.

Biwei Huang, Fan Feng, Chaochao Lu, Sara Magliacane, Kun Zhang, "AdaRL: What, Where, and How to Adapt in Transfer Reinforcement Learning," International Conference on Learning Representations (ICLR) 2022 (spotlight).

Weiran Yao, Yuewen Sun, Alex Ho, Changyin Sun, Kun Zhang, "Learning Temporally Latent Causal Processes from General Temporal Data," International Conference on Learning Representations (ICLR) 2022.

Petar Stojanov, Zijian Li, Mingming Gong, Ruichu Cai, Jaime G. Carbonell, Kun Zhang, "Domain Adaptation with Invariant Representation Learning: What Transformations to Learn?" Neural Information Processing Systems (NeurIPS) 2021.

Jeffrey Adams, Niels Richard Hansen, Kun Zhang, "Identification of Partially Observed Linear Causal Models: Graphical Conditions for the Non-Gaussian and Heterogeneous Cases," Conference on Neural Information Processing Systems (NeurIPS) 2021.

K. Zhang*, M. Gong*, P. Stojanov, B. Huang, Qingsong Liu, and C. Glymour, "Domain Adaptation as a Problem of Inference on Graphical Models," Conference on Neural Information Processing Systems (NeurIPS) 2020.

Feng Xie, Ruichu Cai, Biwei Huang, Clark Glymour, Zhifeng Hao, Kun Zhang, "Generalized Independent Noise Condition for Estimating Linear Non-Gaussian Latent Variable Causal Graphs," Conference on Neural Information Processing Systems (NeurIPS) 2020 (spotlight).

Career

Zhang maintains an associate professorship at Carnegie Mellon University (CMU) in the USA to explore machine learning and AI, especially causal learning, and reasoning, at MBZUAI.

Zhang formulates principles and develops methods for automated causal discovery or causal representation learning from various kinds of data; investigates learning problems including transfer learning, representation learning, and deep learning from a causal view; and studies the philosophical foundations of causation and various machine learning tasks.

Zhang is a general and program chair of the 1st Conference on Causal Learning and Reasoning (CleaR 2022) and a program chair of the 38th Conference on Uncertainty in Artificial Intelligence (UAI 2022).



Department of
Machine Learning



Martin Takáč

Deputy Department Chair
of Machine Learning, and
Associate Professor of Machine Learning

Research interests

Takáč's current research interests include the design and analysis of algorithms for machine learning including large-scale convex/non-convex optimization problems in a distributed and federated learning setting, applications of machine learning and high performance computing (HPC).

Education

- **Ph.D. in mathematics** from the University of Edinburgh, United Kingdom.
- **Master of Science in mathematics** from Comenius University, Slovakia.
- **Bachelor of Science in mathematics** from Comenius University, Slovakia.

Publishing

Takáč currently serves as an associate editor for Mathematical Programming Computation, Journal of Optimization Theory and Applications, and Optimization Methods and Software.

Iteration complexity of randomized block-coordinate descent methods for minimizing a composite function. P Richtárik, M Takáč. *Mathematical Programming* 144 (1), 1-38, 2014.

Parallel coordinate descent methods for big data optimization. P Richtárik, M Takáč. *Mathematical Programming, Series A*, 1-52, 2015.

Reinforcement learning for solving the vehicle routing problem. M Nazari, A Oroojlooy, LV Snyder, M Takáč. *Conference on Neural Information Processing Systems, NeurIPS*, 2018.

SARAH: A novel method for machine learning problems using stochastic recursive gradient. L Nguyen, J Liu, K Scheinberg, M Takáč. In *34th International Conference on Machine Learning, ICML*, 2017.

Communication-efficient distributed dual coordinate ascent. M Jaggi, V Smith, M Takáč, J Terhorst, S Krishnan, T Hofmann, MI Jordan. *Advances in neural information processing systems* 27, 2014.

Distributed coordinate descent method for learning with big data. P Richtárik, M Takáč. *Journal of Machine Learning Research* 17, 1-25, 2016.

Career

Prior to joining MBZUAI, Takáč was an associate professor in the Department of Industrial and Systems Engineering at Lehigh University in Pennsylvania, USA.

He received several awards during this period, including the Best Ph.D. Dissertation Award by the OR Society (2014), Leslie Fox Prize (2nd Prize; 2013) by the Institute for Mathematics and its Applications, and INFORMS Computing Society Best Student Paper Award (runner up; 2012).

Takáč received funding from various U.S. National Science Foundation programs, including through a TRIPODS Institute grant awarded to him and his collaborators at Lehigh, Northwestern, and Boston University.

He is an area chair at machine learning conferences like ICML, NeurIPS, ICLR, and AISTATS.



Department of
Machine Learning



Mohsen Guizani

Professor of Machine Learning

Research interests

Guizani's research interests are in the field of applied machine learning and artificial intelligence, Internet of Things (IoT), intelligent autonomous systems, smart cities, and cybersecurity.

Education

- **Ph.D. in computer engineering** from Syracuse University, USA.
- **Master's in computer engineering** from Syracuse University, USA.
- **Bachelor of Science (with distinction)** from Syracuse University, USA.

Publishing

Guizani has published extensively in high-impact journals and conferences. He has authored/co-authored 10 books and more than 800 technical papers in top journals and conferences and has been granted more than 10 U.S. patents.

Internet of things: A survey on enabling technologies, protocols, and applications. A Al-Fuqaha, M Guizani, M Mohammadi, M Aledhari, M Ayyash. IEEE communications surveys & tutorials 17 (4), 2347-2376, 2015.

Unmanned aerial vehicles (UAVs): A survey on civil applications and key research challenges. H Shakhathreh, AH Sawalmeh, A Al-Fuqaha, Z Dou, E Almaita, I Khalil, et al. Ieee Access 7, 48572-48634, 2019.

Deep learning for IoT big data and streaming analytics: A survey. M Mohammadi, A Al-Fuqaha, S Sorour, M Guizani. IEEE Communications Surveys & Tutorials 20 (4), 2923-2960, 2018.

MeDShare: Trust-less medical data sharing among cloud service providers via blockchain. QI Xia, EB Sifah, KO Asamoah, J Gao, X Du, M Guizani. IEEE access 5, 14757-14767, 2017.

5G wireless backhaul networks: challenges and research advances. X Ge, H Cheng, M Guizani, T Han. IEEE network 28 (6), 6-11, 2014.

A comprehensive review of the COVID-19 pandemic and the role of IoT, drones, AI, blockchain, and 5G in managing its impact. V Chamola, V Hassija, V Gupta, M Guizani. Ieee access 8, 90225-90265, 2020.

Career

Before joining MBZUAI, Guizani served in multiple administrative positions in the USA and the Gulf region, such as the Founding Associate Vice President for Graduate Studies at QU, Chair of the ECE Department at the University of Idaho, Chair of the Computer Science Department at Western Michigan University and Professor at the University of Missouri.

He was elevated to the IEEE Fellow in 2009 for his contribution to “quality of service in broadband and ad hoc wireless networks.” He is a highly cited researcher and was listed as a Clarivate Analytics Highly Cited Researcher in Computer Science in 2019, 2020 and 2021.

Guizani has won several research awards including the 2015 IEEE Communications Society Best Transaction Paper Award as well as four Best Paper Awards from top conferences, such as IEEE ICC and IEEE Globecom.



Department of
Machine Learning



Fakhri Karray

Professor of Machine Learning

Research interests

Karray's research interests are in the areas of operational AI, cognitive machines, natural human-machine interaction, autonomous and intelligent systems. Applications of his research include virtual care systems, cognitive and self-aware machines/robots/vehicles, predictive analytics in supply chain management and intelligent transportation systems.

Education

- **Ph.D. in systems and control**
from University of Illinois Urbana-Champaign, USA.
- **Ing. Dip, Electrical Eng** from the University of Tunis, Tunisia.

Publishing

Fakhri has published extensively in the general field of pattern analysis and machine intelligence and is the author of 20 US registered patents. artificial, biological, and social systems.

Soft Computing and Intelligent Systems Design (Addison Wesley Publishing, 2004).

Elements of Dimensionality Reduction and Manifold Learning (Springer, Publication date: 2022).

G Muhammad, F Alshehri, F Karray, A El Saddik, M Al Sulaiman, TH Falk, "A comprehensive Survey on Multimodal Medical Signals Fusion for Smart Healthcare Systems," Information Fusion, 76, pp. 355-375, 2021.

C Ou and F Karray, "Enhancing Driver Distraction Recognition Using Generative Adversarial Networks," IEEE Transactions on Intelligent Vehicles (3), 385-396, 2019.

Career

Before joining MBZUAI as Provost and Professor of Machine Learning, Karray served as the founding co-director of the University of Waterloo AI Institute. He has held the Loblaws Research Chair in Artificial Intelligence in the department of electrical and computer engineering at the University of Waterloo, Canada.

Karray was honored in 2021 by the IEEE Vehicular Technology Society (VTS) for his novel work on improving traffic flow prediction using weather Information in connected cars through deep learning and tools of AI.

Fakhri is the co-founder and Chief Scientist of Yourika.ai, a provider of AI-based online learning systems. He is a Fellow of IEEE, a Fellow of the Canadian Academy of Engineering, and a Fellow of the Engineering Institute of Canada.



Department of
Machine Learning



Le Song

Professor of Machine Learning

Research interests

Song's research interests are in machine learning methods and algorithms for complex and dynamic data including structured prediction, neuro-symbolic integration, and AI for healthcare and drug design.

Education

- **Ph.D. in computer science**
from the University of Sydney and National ICT, Australia.

Publishing

Song has published more than 160 papers in peer-reviewed, top machine learning conferences and journals such as NeurIPS, ICML, ICLR, AISTATS and JMLR.

Molecule Generation for Drug Design: a Graph Learning Perspective. N Yang, H Wu, J Yan, X Pan, Y Yuan, L Song. arXiv preprint arXiv:2202.09212. 2022.

Method and apparatus for processing user interaction sequence data. X Chang, J Wen, X Liu, L Song, Y Qi. US Patent 11,250,088. 2022.

Learning Temporal Rules from Noisy Timeseries Data. K Samel, Z Zhao, B Chen, S Li, D Subramanian, I Essa, L Song. arXiv preprint arXiv:2202.05403. 2022.

Sphereface: Deep hypersphere embedding for face recognition. W Liu, Y Wen, Z Yu, M Li, B Raj, L Song. Proceedings of the IEEE conference on computer vision and pattern. 2017.

Learning combinatorial optimization algorithms over graphs. E Khalil, H Dai, Y Zhang, B Dilkina, L Song. Advances in neural information processing systems 30, 2017.

A Hilbert space embedding for distributions. A Smola, A Gretton, L Song, B Schölkopf. International Conference on Algorithmic Learning Theory, 13-31, 2007.

Career

Prior to joining MBZUAI, Song was an associate professor of computational science and engineering and the associate director of Center for Machine Learning at the Georgia Institute of Technology in the USA.

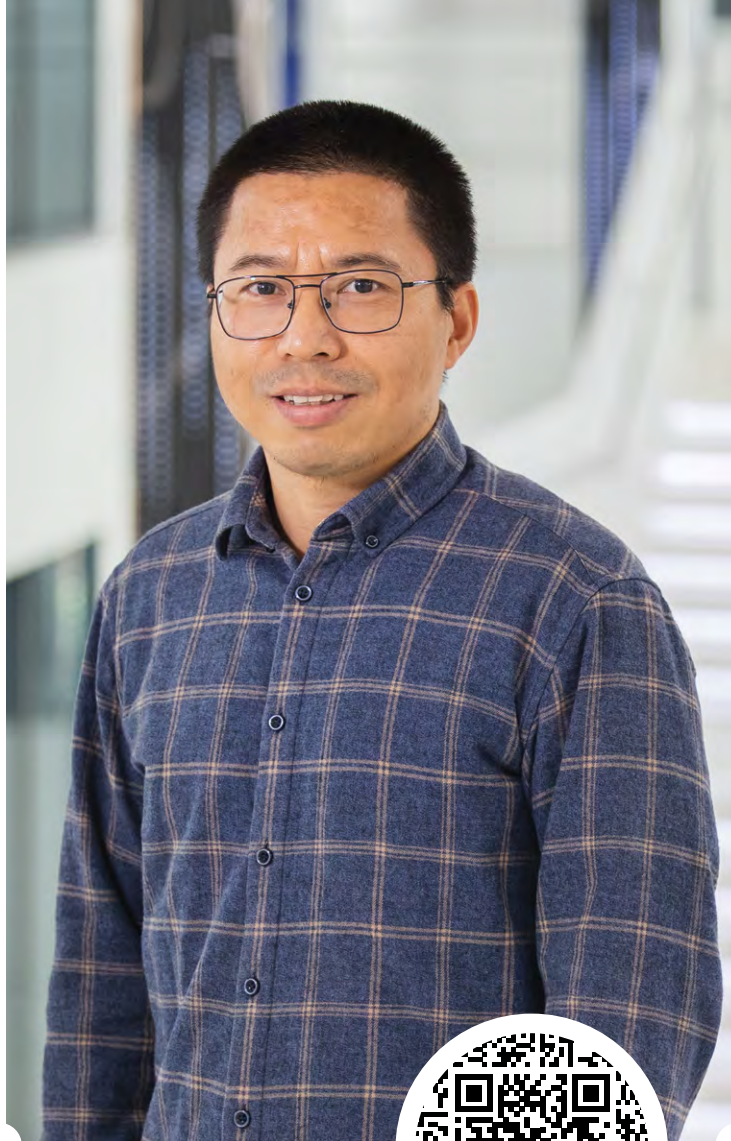
He spent several years at various institutes such as Georgia Institute of Technology, Google Research, Carnegie Mellon University and National ICT Australia.

Song's remarkable works won several best paper awards at the ACM Conference on Recommendation System (Recsys) in 2016, Artificial Intelligence and Statistics (AISTATS) in 2016, IEEE International Parallel and Distributed Processing Symposium (IPDPS) in 2015, Neural Information Processing Systems (NeurIPS) in 2013, and International Conference on Machine Learning (ICML) in 2010.

Song is a chair of the 39th International Conference on Machine Learning (ICML 2022).



Department of
Machine Learning



Bin Gu

Assistant Professor of Machine Learning

Research interests

Gu's research interests focus on large scaling optimization in machine learning, spiking neural networks, and data mining.

Education

- **Ph.D. in computer science**
from the Nanjing University of Aeronautics and Astronautics, China.
- **Bachelor of Science in computer science**
from the Nanjing University of Aeronautics and Astronautics, China.

Publishing

Gu has published 70 or more papers, with more than 3000 citations.

Incremental support vector learning for ordinal regression. B Gu, VS Sheng, KY Tay, W Romano, S Li. *IEEE Transactions on Neural networks and learning systems* 26 (7), 1403-1416, 2014.

A Robust Regularization Path Algorithm for ν -Support Vector Classification. B Gu, VS Sheng. *IEEE Transactions on neural networks and learning systems* 28 (5), 1241-1248, 2016.

Incremental learning for ν -support vector regression. B Gu, VS Sheng, Z Wang, D Ho, S Osman, S Li. *Neural networks* 67, 140-150, 2015.

Structural minimax probability machine. B Gu, X Sun, VS Sheng. *IEEE Transactions on Neural Networks and Learning Systems* 28 (7), 1646-1656, 2016.

Direct estimation of cardiac biventricular volumes with an adapted bayesian formulation. Z Wang, MB Salah, B Gu, A Islam, A Goela, S Li. *IEEE Transactions on Biomedical Engineering* 61 (4), 1251-1260, 2014.

Career

Prior to joining MBZUAI, Gu was a full professor of Nanjing University of Information Science and Technology in China. He was a postdoctoral fellow with the University of Western Ontario from 2013 to 2015, with the University of Texas at Arlington from 2016 to 2017, and the University of Pittsburgh from 2017 to 2018.

Gu served as a program committee member or reviewer for several leading machine learning and data mining conferences and journals such as NIPS, ICML, KDD, AAAI, TPAMI, JMLR, and a senior program committee member of IJCAI 2019 to 2021.



Department of
Machine Learning



Qirong Ho

Assistant Professor of Machine Learning

Research interests

Ho's primary area of research interest is in software systems for the industrialization of machine learning (ML) programs. These ML software systems must enable, automate, and optimize over multiple tasks: composition of elementary ML program and systems "building blocks" to create sophisticated applications, scaling to very large data and model sizes, resource allocation and scheduling, hyperparameter tuning, and code-to-hardware placement.

Education

- **Ph.D. in machine learning** from the from Carnegie Mellon University, USA.
- **Bachelor of Science in computational biology** from Carnegie Mellon University, USA.

Publishing

Ho has published more than 70 papers with more than 3400 citations. He holds U.S. patents in the areas of distributed deep learning and machine learning, AI operating systems, and elastic management of machine learning computing.

Pollux: Co-adaptive cluster scheduling for goodput-optimized deep learning (OSDI, 2021).

Poseidon: An efficient communication architecture for distributed deep learning on GPU clusters (USENIX ATC, 2017).

Strategies and principles of distributed machine learning on big data (Engineering, Vol 2, Issue 2, 2016).

Petuum: A new platform for distributed machine learning on big data (IEEE Transactions on Big Data, Vol 1(2), 2015).

More effective distributed ml via a stale synchronous parallel parameter server (NeurIPS, 2013).

Analyzing Time-Evolving Networks using an Evolving Cluster Mixed Membership Stochastic Blockmodel (Handbook of Mixed Membership Models and its Applications, Chapter 22, 2014).

Career

Ho is co-founder and CTO at Petuum Inc., a unicorn AI startup which has been recognized as a World Economic Forum Tech Pioneer for creating standardized building blocks that enable assembly-line production of AI, in a manner that is affordable, sustainable, scalable, and requires less training of AI workers.

Ho is a member of the Technical Committee for the Composable, Automatic and Scalable ML (CASL) open-source consortium.

His doctoral thesis received the 2015 SIGKDD Dissertation Award (runner-up).



Department of
Machine Learning



Samuel Horváth

Assistant Professor of Machine Learning

Research interests

Horváth's research interests lie at the intersection of mathematics, computer science, machine learning, optimization, and statistics, with a particular focus on federated learning.

Education

- **Ph.D. in statistics**, King Abdullah University of Science and Technology (KAUST), Kingdom of Saudi Arabia.
- **Master's in statistics**, King Abdullah University of Science and Technology (KAUST), Kingdom of Saudi Arabia.
- **Bachelor (Summa Cum Laude) in mathematics of economics and finance** from Comenius University, Slovakia.

Publishing

Horváth's research has been published in leading AI conferences such as ICML, NeurIPS or ICLR.

"Fedshuffle: Recipes for better use of local work in federated learning", S Horváth, M Sanjabi, L Xiao, P Richtárik, M Rabbat"

"Adaptivity of Stochastic Gradient Methods for Nonconvex Optimization", S Horváth, L Lei, P Richtárik, MI Jordan, SIAM Journal on Mathematics of Data Science (SIMODS)

"FJORD: Fair and Accurate Federated Learning under heterogeneous targets with Ordered Dropout", S Horváth, S Laskaridis, M Almeida, I Leontiadis, SI Venieris, ND Lane, 35th Conference on Neural Information Processing Systems (NeurIPS 2021)

"A Better Alternative to Error Feedback for Communication-Efficient Distributed Learning", S Horváth, P Richtárik, International Conference on Learning Representations (ICLR 2021)

Career

Prior to joining MBZUAI, Horváth completed his M.Sc. (2018) and Ph.D. (2022) in statistics at King Abdullah University of Science and Technology (KAUST) in Kingdom of Saudi Arabia. He has a relatively rich industrial experience obtained via research internships, including Amazon Scalable Machine Learning, Germany (2019), Samsung AI Centre, United Kingdom (2020), and Facebook AI Research, Canada (2021).

He received several awards during his studies, including a Best Paper Award at the NeurIPS Workshop on Scalability, Privacy, and Security in Federated Learning (2020), the Best Poster Award at the Data Science Summer School (DS3), Ecole Polytechnique, France (2018), the Best Reviewer Award at NeurIPS (2020). Horváth regularly serves as a program committee member for leading machine learning journals and conferences, including the Journal of Machine Learning, ICML, and NeurIPS.



Department of
Machine Learning



Shangsong Liang

Assistant Professor of Machine Learning

Research interests

Liang's research interests lie in the field of information retrieval, data mining, AI, and machine learning (especially deep learning).

Education

- **Visiting postdoctoral researcher** at the University of Massachusetts Amherst, United States.
- **Postdoctoral researcher** at the University of Amsterdam, The Netherlands.
- **Ph.D. in computer science** from the University of Amsterdam, The Netherlands.

Publishing

Liang has published more than 70 peer-reviewed papers, most of which are in top-tier venues such as SIGIR, KDD, NeurIPS, WWW, AAAI, IJCAI, WSDM, CIKM, TKDE, TOIS, and TKDD. They cover topics related to graph neural networks, embedding learning, pre-training models, meta learning, contrastive learning, variational auto-encoder models, mining in data streams, clustering, web search, personalized search, search result diversification, learning to rank, recommendation systems, language models, and expert retrieval.

Jinyuan Fang, Zaiqiao Meng, Qiang Zhang, and Shangsong Liang. Structure-Aware Random Fourier Kernel for Graphs, *Neural Information Processing Systems 2021, NeurIPS 2021*. Full paper. 2021.

Shangsong Liang, Yupeng Luo, and Zaiqiao Meng. Profiling Users for Question Answering Communities via Flow-based Constrained Co-embedding Model. *ACM Transactions on Information Systems (TOIS)*, 2021.

Shangsong Liang, Zhuo Ouyang, and Zaiqiao Meng. A Normalizing Flow-based Co-embedding Model for Attributed Networks. *ACM Transactions on Knowledge Discovery from Data (TKDD)*, 2021.

Jinyuan Fang, Shangsong Liang, Zaiqiao Meng, and Maarten de Rijke. Hyperspherical Variational Co-embedding for Attributed Networks. *ACM Transactions on Information Systems (TOIS)*, 2021.

Yaoxin Pan, Zaiqiao Meng, Shangsong Liang. Personalized, Sequential, Attentive, Metric-Aware Product Search. *ACM Transactions on Information Systems (TOIS)*, 2021.

Shangsong Liang, Shaowei Tang, Zaiqiao Meng, and Qiang Zhang. Cross-Temporal Snapshot Alignment for Dynamic Networks. *IEEE Transactions on Knowledge and Data Engineering (TKDE)*. 2021.

Career

Prior to joining MBZUAI, Liang was a research scientist at the King Abdullah University of Science and Technology (KAUST) and an associate researcher at the University College London (UCL).

Liang is an editor member of the journal of Information Processing and Management, and a Young Associate Editor-in-Chief of the Journal of Computer Science and Technology since 2021. He is PC member and reviewer in several conferences and journals.

Liang has received various awards/honors such as the SIGIR 2017 Outstanding Reviewer Award, Outstanding Contribution for instructing Data Mining course from the International Petroleum Engineers, the Kingdom of Saudi Arabia Section.



Department of
Machine Learning



Maxim Panov

Assistant Professor of Machine Learning

Research interests

Panov's current research is focused on uncertainty quantification for machine learning model predictions, Bayesian approaches in machine learning, and graph analytics. The emphasis is on the theoretical grounds of the developed methods, their computational efficiency, and practical applicability to computer vision, natural language processing and other problems.

Education

- **Ph.D. in mathematical statistics** from Institute for Information Transmission Problems of Russian Academy of Sciences.
- **B.Sc. and M.Sc. in applied mathematics** from Moscow Institute of Physics and Technology.

Publishing

Makni, V. Plassier, A. Rubashevskii, E. Moulines, M. Panov. Conformal Prediction for Federated Uncertainty Quantification Under Label Shift, ICML 2023

Vazhentsev, A. Tsvigun, G. Kuzmin, A. Panchenko, M. Panov, M. Burtsev and A. Shelmanov. Hybrid Uncertainty Estimation for Selective Text Classification in Ambiguous Tasks, Annual Meeting of Association of Computational Linguistics, ACL, 2023

Seddik, M. Tiomoko, A. Decurninge, M. Panov, M. Guillaud. Learning from Low Rank Tensor Data: A Random Tensor Theory Perspective, UAI 2023

Klopp, O., Panov, M., Sigalla, S. and Tsybakov, A. Assigning Topics to Documents by Successive Projections, Annals of Statistics, 2023

Kotelevskii, A. Artemenkov, K. Fedyanin, F. Noskov, A. Fishkov, A. Shelmanov, A. Vazhentsev, A. Petiushko, M. Panov. Nonparametric Uncertainty Quantification for Single Deterministic Neural Network, NeurIPS 2022

Velikanov, R. Kail, I. Anokhin, R. Vashurin, M. Panov, A. Zaytsev and D. Yarotsky. Embedded Ensembles: infinite width limit and operating regimes, AISTATS 2022

Career

Starting in 2010, Panov worked as a research scientist at DATADVANCE Company, where he participated in developing the library of data analysis methods for engineering applications. This library, pSeven, is now used by many companies worldwide, including Airbus, Porsche, Mitsubishi, Toyota, and Limagrain. From 2018, Panov has been an assistant professor at Skolkovo Institute of Science and Technology, Moscow, where he led a statistical machine learning group. Since 2022, he has led an AI theory and algorithms group at the Technology Innovation Institute, Abu Dhabi, UAE.

Panov has been awarded funding from various governmental and private sources. He received the Moscow Government Award for Young Scientists 2018 and the Skoltech Faculty Excellence Award 2022. He also won the Best Paper Runner-up Award at the Uncertainty in Artificial Intelligence 2023 conference. Panov is an associate editor at the Journal of Statistical Planning and Inference.



Department of
Machine Learning



Zhiqiang Shen

Assistant Professor of Machine Learning

Research interests

Shen's research interests focus on the broad areas of efficient deep learning, machine learning, and computer vision. Specifically, he is interested in deep learning methods for image recognition and object detection, efficient deep architectures and parameter-efficient fine-tuning strategies, etc.

Education

- **Ph.D. in computer science** from Fudan University, China.
- **Joint-training Ph.D. student in engineering** from University of Illinois Urbana-Champaign, USA.

Publishing

Shen has been a conference and journal reviewer for top tier computer science conferences and journals. In 2023, he was a meta-reviewer (SPC) at the Association for the Advancement of Artificial Intelligence (AAAI) Conference on Artificial Intelligence 2023.

Zhiqiang Shen, Eric Xing. "A Fast Knowledge Distillation Framework for Visual Recognition". ECCV 2022.

Zhiqiang Shen, Zechun Liu, Eric Xing. "Sliced Recursive Transformer". ECCV 2022.

Zhiqiang Shen, Zechun Liu, DeJia Xu, Zitian Chen, Kwang-Ting Cheng, Marios Savvides. "Is Label Smoothing Truly Incompatible with Knowledge Distillation: An Empirical Study". ICLR 2021.

Zechun Liu*, Zhiqiang Shen*, Shichao Li, Koen Helwegen, Dong Huang, Kwang-Ting Cheng. "How Do Adam and Training Strategies Help BNNS Optimization?". ICML 2021.

Zhiqiang Shen, Zechun Liu, Zhuang Liu, Marios Savvides, Trevor Darrell, Eric Xing. "Un-Mix: Rethinking Image Mixture for Unsupervised Visual Representation Learning". AAAI 2022.

Zhiqiang Shen, Zechun Liu, Jie Qin, Lei Huang, Kwang-Ting Cheng, Marios Savvides. "S2-BNN: Bridging the Gap Between Self-Supervised Real and 1-bit Neural Networks via Guided Distribution Calibration". CVPR 2021.

Career

Prior to joining MBZUAI, Shen was an assistant research professor in the Department of Computer Science and Engineering at Hong Kong University of Science and Technology (HKUST), China. He was a postdoctoral researcher at CyLab, Carnegie Mellon University (CMU). Prior to CMU, he was a joint-training Ph.D. student at University of Illinois Urbana-Champaign (UIUC) and Fudan University. He was also an IAS Junior Fellow from the Jockey Club Institute for Advanced Study at HKUST.

Shen's research interests focus on the broad areas of efficient deep learning, machine learning, and computer vision. Specifically, he is interested in deep learning methods for image recognition and object detection, efficient deep architectures and parameter-efficient fine-tuning strategies, etc. Most recently, he is focusing on: (1) low-bit neural networks; (2) knowledge distillation for models and data; (3) designing and training highly efficient network architectures for CNNs and transformers; (4) un(self-)supervised / weakly-supervised learning; (5) image understanding including object detection, recognition, and captioning; and (6) few-shot learning.



Department of
Machine Learning



Huan Xiong

Assistant Professor of Machine Learning

Research interests

Xiong's research interests include machine learning and discrete mathematics. More specifically, including expressive power and complexity of deep neural networks, few-shot learning and domain generalization, and combinatorial optimization.

Education

- **Ph.D. in mathematics** from the Institute of Mathematics, University of Zurich, Switzerland.
- **Master's degree in mathematics** from the School of Mathematical Sciences, Peking University, China.
- **Bachelor of Science in mathematics** from the School of Mathematical Sciences, Peking University, China.

Publishing

Xiong has authored or co-authored more than 35 academic publications in ICML, the Proceedings of IEEE, and others, and has been cited hundreds of times.

H. Xiong, M. Yu, L. Liu, F. Zhu, J. Qin, F. Shen, L. Shao. *A Generalized Method for Binary Optimization: Convergence Analysis and Applications*, TPAMI 2021.

G. Xie, J. Liu, H. Xiong, L. Shao. *Scale-Aware Graph Neural Network for Few-Shot Semantic Segmentation*, CVPR 2021.

G. Xie, J. Liu, H. Xiong, Y. Yao, L. Shao. *Few-Shot Semantic Segmentation with Cyclic Memory Network*, ICCV 2021.

H. Xiong, L. Huang, M. Yu, L. Liu, F. Zhu, and L. Shao. *On the Number of Linear Regions of Convolutional Neural Networks*, ICML 2020

Several Fundamental Problems in Deep Learning and Meta-Learning. MBZUAI Start-Up Fund, PI, 1,817,244 AED in total, three years.

Energy-based Probing for Spiking Neural Networks. TII Fund, co-PI, 5,874,400 AED in total, three years.

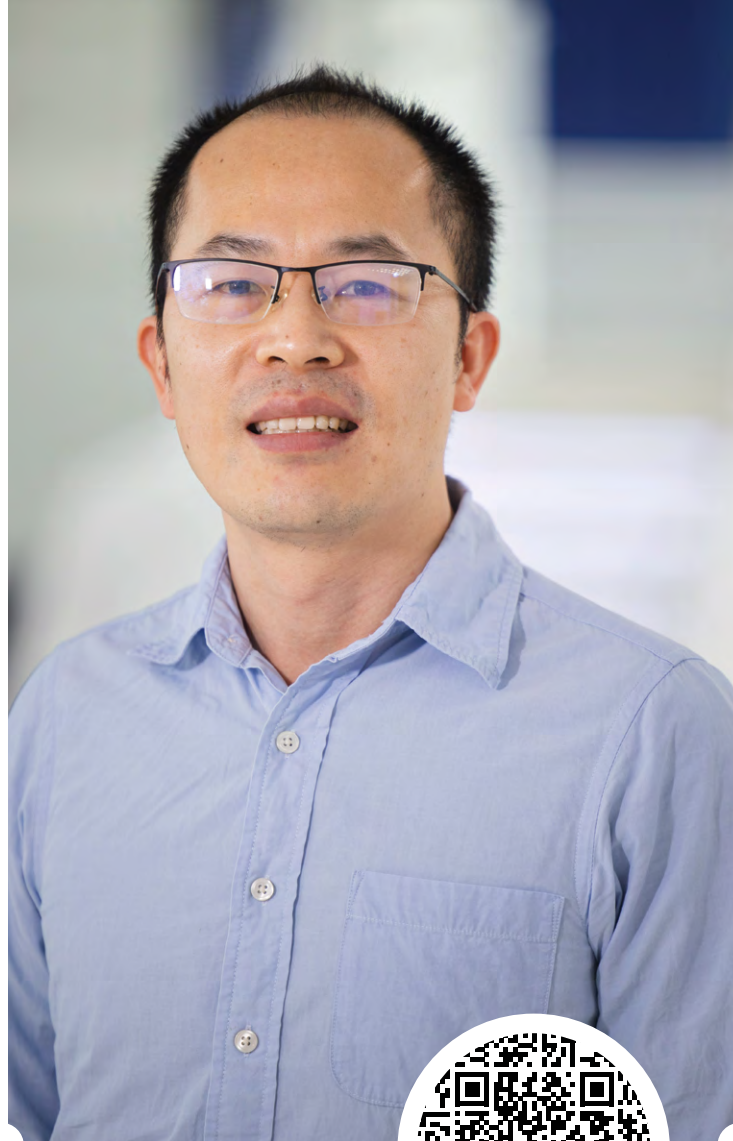
Career

Prior to joining MBZUAI, Xiong was a research scientist at the Inception Institute of Artificial Intelligence (IIAI), Abu Dhabi, United Arab Emirates. He was a postdoctoral researcher at the Institute for Advanced Mathematical Research, University of Strasbourg, France, from 2016 to 2018.

Xiong hosted two research projects funded by the Swiss National Science Foundation (SNSF) and the French National Centre for Scientific Research (CNRS) respectively.



Department of
Machine Learning



Zhiqiang Xu

Assistant Professor of Machine Learning

Research interests

Xu's research interests lie at the intersection of numerical computation, stochastic optimization, and Riemannian optimization. He is also interested in deep learning, clustering, community detection, topic modeling, etc. His recent ongoing works are about faster alternating least-squares for CCA, comprehensively tight analysis of gradient descent for PCA, accelerated inexact power methods, and Riemannian search for eigenvector computation.

Education

- **Ph.D. in computer engineering**
from the Nanyang Technological University, Singapore.

Publishing

Li has authored or co-authored more than 20 research papers with more than 600 citations.

Zhiqiang Xu and Ping Li. Faster Noisy Power Method. ALT 2022.

Zhiqiang Xu and Ping Li. A Comprehensively Tight Analysis of Gradient Descent for PCA. NeurIPS 2021.

Zhiqiang Xu and Ping Li. On the Riemannian Search for Eigenvector Computation. JMLR 2021.

Zhiqiang Xu and Ping Li. On the Faster Alternating Least-Squares for CCA. AISTATS 2021.

Zhiqiang Xu and Ping Li. Towards Practical Alternating Least-Squares for CCA. NeurIPS 2019.

Zhiqiang Xu. Gradient descent meets shift-and-invert preconditioning for eigenvector computation. NeurIPS 2018.

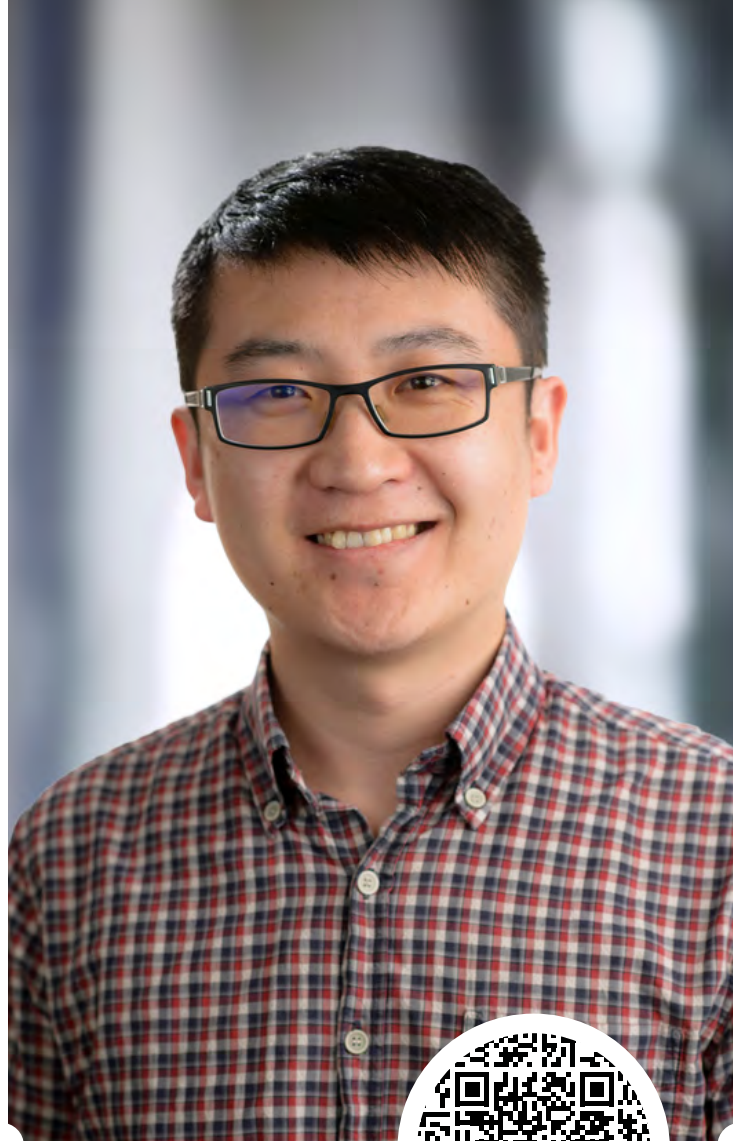
Career

Prior to joining MBZUAI, Xu was a senior research scientist with Baidu Research in China. Xu served as a reviewer for several academic activities of NeurIPS, ICML, ICLR, IJCAI, AAI in various years.

He also has industrial experience in automatic optical inspection (AOI) for TFT-LCD panels and solar wafers, data analytics for airlines and insurances.



Department of
Machine Learning



Tongliang Liu

Visiting Associate Professor
of Machine Learning

Research interests

Liu is broadly interested in designing and understanding machine learning algorithms in the fields of trustworthy machine learning, with a particular emphasis on the topics of learning with noisy labels, adversarial learning, transfer learning, unsupervised learning, and statistical deep learning theory.

Education

- **Ph.D. in machine learning** from University of Technology Sydney, Australia.
- **Bachelor in engineering** from University of Science and Technology of China, China.

Publishing

Liu has previously been the senior meta-reviewer of AAAI and IJCAI and is regularly the meta-reviewer of ICML, NeurIPS, ICLR, AAAI, and IJCAI.

Classification with Noisy Labels by Importance Reweighting. T. Liu and D. Tao. *IEEE T-PAMI*, 38(3): 447-461, 2016.

Algorithmic Stability and Hypothesis Complexity. T. Liu, G. Lugosi, G. Neu and D. Tao. In *ICML*, 2017.

Modeling Adversarial Noise for Adversarial Defense. D. Zhou, N. Wang, B. Han, and T. Liu. In *ICML*, 2022.

Part-dependent Label Noise: Towards Instance-dependent Label Noise. [Spotlight] X. Xia, T. Liu, B. Han, N. Wang, M. Gong, H. Liu, G. Niu, D. Tao, and M. Sugiyama. In *NeurIPS*, 2020.

Domain Adaptation with Conditional Transferable Components. M. Gong, K. Zhang, T. Liu, D. Tao, C. Glymour, and B. Schölkopf. In *ICML*, 2016.

Instance-Dependent Label-Noise Learning under Structural Causal Models. Y. Yao, T. Liu, M. Gong, B. Han, G. Niu, and K. Zhang. In *NeurIPS*, 2021.

Career

Liu has joined MBZUAI as a Visiting Associate Professor of Machine Learning. He is also the director of Sydney AI Centre and a senior lecturer at University of Sydney, Australia; a visiting professor of University of Science and Technology of China, Hefei, China; and a visiting scientist of RIKEN AIP, Tokyo, Japan. Liu works as a Future Fellow of the Australian Research Council (ARC). He has been widely recognised by his research. His research interests lie in providing mathematical and theoretical foundations to justify and understand (deep) machine learning models and designing efficient learning algorithms for problems in computer vision and data mining, with a particular emphasis on: Liu was ranked among the Best Rising Stars of Science in Australia by

- Learning with noisy labels.
- Deep adversarial learning.
- Causal representation learning. Deep transfer learning.
- Deep unsupervised learning. Statistical deep learning theory.

Research.com in 2022; he was ranked among the Global Top Young Chinese Scholars in AI by Baidu Scholar in 2022; he was named in the Early Achievers Leaderboard by The Australian in 2020. He is the Action Editor of *Transactions on Machine Learning Research*, Associate Editor of *ACM Computing Surveys*, and in the Editorial Board of *Journal of Machine Learning Research* and the *Machine Learning journal*.



Department of
Machine Learning



Huseyin Ucar

Visiting Assistant Professor
of Machine Learning

Research interests

Ucar's research interests involve design and discovery of magnetic materials for energy and biomedical applications. He develops robust machine learning models that can be used to guide experimental colleagues in a data-driven manner rather than guesswork; hence, speeding up the discovery of advanced magnets. This will impact clean-energy applications where permanent magnets are used as well as magnetic refrigeration and cancer thermotherapy. He aspires to employ (i) transfer learning and (ii) text mining strategies to tackle issues within the materials informatics field.

Education

- **Postdoc. in material science** from Oak Ridge National Lab
- **Ph.D. in materials science and engineering** from Carnegie Mellon University
- **Master's in materials science and engineering** from Carnegie Mellon University

Publishing

Ensign, B., Choudhary, R., Ucar, H., & Paudyal, D. (2020). Electronic structure, magnetic properties, and exchange splitting of gadolinium intermetallics. *Journal of Magnetism and Magnetic Materials*, 509, 166882.

Ucar, H., Paudyal, D., & Choudhary, K. (2022). Machine learning predicted magnetic entropy change using chemical descriptors across a large compositional landscape. *Computational Materials Science*, 209, 111414.

Ucar, H., & Paudyal, D. (2021). Unraveling Site Selective Magnetic Properties of Cobalt Sites in Critical Elements Lean RE (TM)5Magnet Materials. *JOM*, 73(12), 3894-3900.

Ucar, H., Paudyal, D., & Boyraz, O. (2020). Using numerical methods to screen magnetocaloric materials in an active magnetic regenerative cycle. *International Journal of Refrigeration*, 120, 50-57.

Ucar, H., Choudhary, R., & Paudyal, D. (2020). Substitutional and interstitial doping in LaCo5 system for the development of hard magnetic properties: A first principles study. *Journal of Alloys and Compounds*, 836, 155263.

Ucar, H., Choudhary, R., & Paudyal, D. (2020). An overview of the first principles studies of doped RE-TM5 systems for the development of hard magnetic properties. *Journal of Magnetism and Magnetic Materials*, 496, 165902.

Career

Ucar received his Ph.D. in materials science and engineering from Carnegie Mellon University in Pittsburgh, Pennsylvania followed up with a two-year post doctorate at Oak Ridge National Laboratories in Knoxville, Tennessee in the United States of America. He holds a patent in surface modification of permanent magnets through his research at Oak Ridge National Labs. Following my post doctorate, I accepted an Assistant Professor position at Florida Polytechnic University in Lakeland, FL. He is currently an Associate Professor at California Polytechnic University in Pomona, CA. As the recipient of a Fulbright Scholar award this academic year, he will be conducting research with Dr. Martin Takac at MBZUAI.



Department of
Machine Learning



Gus Xia

Assistant Professor of Machine Learning

Research interests

Xia's research is very interdisciplinary. He is broadly interested in the design of interactive intelligent systems to extend human musical creation and expression. This research lies in the intersection of machine learning, HCI, robotics, and computer music. Some representative works include interactive composition via style transfer, human-computer interactive performances, autonomous dancing robots, large-scale content-based music retrieval, haptic guidance for flute tutoring, and bio-music computing using slime mold.

Education

- **Ph.D. in machine learning** from Carnegie Mellon University, Pennsylvania, USA.
- **Bachelor of Science in information management and information system (minor of psychology)** from Peking University, China.
- **Private DI (Chinese flute) performance study** from the China Conservatory of Music, China.



Publishing

Xia researches and designs intelligent systems to “understand” and “extend” musical creativity and expression. To “understand” means to learn the musical representation conveyed through sounds, performances, and symbolic compositions. To “extend” means to use such an understanding to create artificial music partners, serving music lovers at all levels.

Wang, D. Xu, G. Xia, Y. Shan, “Audio-to-symbolic Arrangement via Cross-modal Music Representation Learning”, in Proc. 47th International Conference on Acoustics, Speech and Signal Processing. Singapore & Online, May 2022.

Wei, G. Xia, W. Gao, L. Lin, Y. Zhang, “Music Phrase Inpainting Using Long-term Representation and Contrastive Loss”, in Proc. 47th International Conference on Acoustics, Speech and Signal Processing. Singapore & Online, May 2022.

Chin, G. Xia, “A Computer-aided Multimodal Music Learning System with Curriculum: A Pilot Study”, in Proc. 2nd International Conference on New Interfaces for Musical Expression, New Zealand, July 2021.

Piao, G. Xia, “Sensing the Breath: A Multimodal Singing Tutoring Interface with Breath Guidance”, in Proc. 2nd International Conference on New Interfaces for Musical Expression, New Zealand, July 2021.

2021 Zhao, G. Xia, “AccoMontage: Accompaniment Arrangement via Phrase Selection and Style Transfer”, in Proc. 22nd International Society for Music Information Retrieval Conference, Online, Oct 2021.

Lin, Q. Kong, J. Jiang, G. Xia, “A Unified Model for Zero-shot Music Source Separation, Transcription and Synthesis”, in Proc. 22nd International Society for Music Information Retrieval Conference, Online, Oct 2021.

Career

Xia is a Global Network Assistant Professor in Computer Science at New York University, Shanghai. He also holds affiliations at Tandon, CILVR at the Center for Data Science, and MARL at Steinhardt. He received his Ph.D. in the machine learning department at Carnegie Mellon University (CMU) in 2016, and he was a Neukom Fellow at Dartmouth from 2016 to 2017.

Xia is also a professional Di and Xiao (Chinese flute and vertical flute) player. He plays as a soloist in the NYU Shanghai Jazz ensemble, Pitt Carpathian Ensemble, and Chinese Music Institute of Peking University.



Department of
Machine Learning



Najwa Aaraj

Adjunct Professor of Machine Learning

Research interests

Aaraj is the chief researcher of the Cryptography Research Center at TII. Aaraj leads the research and development of cryptographic technologies, including postquantum cryptography (PQC) software libraries and hardware implementations, lightweight cryptographic libraries for embedded and RF systems, cryptanalysis, and applied machine learning for cryptographic technologies. She is also Acting Chief Researcher at TII's Autonomous Robotics Research Centre (ARRC).

Education

- **Ph.D. in applied cryptography and embedded systems security** from Princeton University, USA.

Publishing

Aaraj has written multiple conference papers, Institute of Electrical and Electronics Engineers (IEEE) and Association for Computing Machinery (ACM) journal papers and book chapters, and received patents on applied cryptography, embedded system security, and machine learning-based protection of Internet of Things (IoT) systems.

Solving systems of Boolean multivariate equations with quantum annealing. Accepted in Physical Review Journal.

Machine Learning Assisted Security Analysis of 5G Network Connected Systems. Accepted in IEEE Transactions on Emerging Topics in Computing.

An Efficient Dynamic Symmetric Searchable Encryption Scheme with Forward and Backward Privacy, accepted in Indocrypt 2021.

S. Deshpande, S. del Pozo, V. Mateu, M. Manzano, N. Aaraj, and J. Szefer, "Modular Inverse for Integers using Fast Constant Time GCD Algorithm and its Applications", accepted in 30th International Conference on Field-Programmable Logic and Applications.

T. Saha, N. Aaraj, and N. K. Jha, "SHARKS: Smart Hacking Approach for Risk Scanning in Internet-of-Things and Cyber-Physical Systems based on Machine Learning" in IEEE Transactions on Emerging Topics in Computing.

D. Soni, K. Basu, M. Nabeel, N. Aaraj, M. Manzano, and R. Karri "Hardware Architectures for Post-Quantum Digital Signature Schemes" in Springer Nature.

Career

Aaraj has more than 15 years of experience with global firms, working in multiple geographies from Australia to the United States. Prior to joining MBZUAI, Aaraj was Senior Vice President at DarkMatter, a cyber-security leader based in the UAE.

She was formerly at Booz & Company, where she led consulting engagements in the communication and technology industry for clients globally. She also held positions at IBM T.J. Watson Security Research in New York State, Intel in Portland, Oregon.

Dr Aaraj is on the advisory board of New York-based NeuTigers, a leading-edge startup revolutionizing the next generation of energy/latency-efficient artificial intelligence (AI).

She is also a board member and adviser to multiple security and machine learning startups including Okinawa Graduate Institute of Science and Technology. She is a member of the Strategic Advisory Group of Paladin Capital Group based out of Washington DC.

She has also been appointed as the chairman of the UAE AI Expert Group, UAE Council for AI and Blockchain.



Department of
Machine Learning



Eric Moulines

Adjunct Professor of Machine Learning

Research interests

Moulines' current research topics include high-dimensional Monte Carlo sampling methods, stochastic optimization, and generative models (variational autoencoders, generative adversarial networks). He applies these various methods to uncertainty quantification, Bayesian inverse problems, and control of complex systems.

Education

- **Degree in engineering** from Ecole Polytechnique, France.
- **Ph.D. in electrical engineering** from Ecole Nationale Supérieure des Télécommunication, France.

Publishing

Moulines has published more than 120 articles in leading journals in signal processing, computational statistics, and applied probability, and more than 300 proceedings at major conferences on signal processing and machine learning.

Gersende Fort, Pierre Gach, and Eric Moulines. Fast incremental expectation maximization for finite-sum optimization: nonasymptotic convergence. *Statistics and Computing*, 31(4):1–24, 2021.

Aymeric Dieuleveut, Gersende Fort, Eric Moulines, and Genevieve Robin. Federated-EM with heterogeneity mitigation and variance reduction. In *Advances in Neural Information Processing Systems*, volume 35, 2021.

Alain Durmus, Eric Moulines, Alexey Naumov, Sergey Samsonov, Kevin Scaman, and Hoi-To Wai. Tight high probability bounds for linear stochastic approximation with fixed stepsize. In *Advances in Neural Information Processing Systems*, volume 34, 2021.

Alain Durmus, Eric Moulines, Eero Saksman, et al. Irreducibility and geometric ergodicity of Hamiltonian Monte Carlo. *Annals of Statistics*, 48(6):3545–3564, 2020.

Geneviève Robin, Olga Klopp, Julie Josse, Eric Moulines, and Robert Tibshirani. Main effects and interactions in mixed and incomplete data frames. *Journal of the American Statistical Association*, 115 (ja):1292–1303, 2020.

Alain Durmus, Eric Moulines, and Marcelo Pereyra. Efficient Bayesian computation by proximal Markov chain Monte Carlo: when Langevin meets Moreau. *SIAM J. Imaging Sci.*, 11(1):473– 506, 2018. ISSN 1936-4954.

Career

In 1990, Moulines joined the Signal and Image Processing Department at Télécom ParisTech, where he was appointed full professor in 1996. In 2015, he moved to the Center for Applied Mathematics at Ecole Polytechnique, where he is currently professor of statistics. His areas of expertise include computational statistics (Monte Carlo simulations, stochastic optimization), probabilistic machine learning, statistical signal processing, and time series analysis (sequential Monte Carlo methods, nonlinear filtering). He is a EURASIP and IMS Fellow.

His current research themes aim to solve the challenges related to the need for rapid analysis of computational statistics created by ever-larger datasets. The four themes include: (1) Understanding and optimizing principled approximate inference in complex statistical models; (2) Develop principled statistical approaches for massive data sets and high-dimensional models; (3) Federated and distributed computational statistics; and (4) Theory and methodology for optimizing high-dimensional algorithms.



Department of
Machine Learning



Eran Segal

Adjunct Professor of Machine Learning

Research interests

Segal's research focuses on developing multi-modal AI models for personalized medicine based on big data from human cohorts, including microbiome, genetics, nutrition, and lifestyle data.

Education

- **Ph.D. in computer science** from Stanford University, USA.
- **Ph.D. minor in genetics** from Stanford University, USA.
- **B.Sc. in computer science** from Tel-Aviv University, Israel.

Publishing

Segal has published more than 200 publications, and received several awards and honors for his work, including the Overton prize (awarded annually by the International Society for Bioinformatics (ICSB) to one scientist for outstanding accomplishments in computational biology).

almor-Barkan et al., E. Segal. Metabolomic & microbiome profiling reveals personalized risk factors for coronary artery disease. *Nature Medicine* (2022), 28(2):303-314.

Levin D, Raab N, et al., Pinto Y, et al., E. Segal. Diversity and functional landscapes in the microbiota of animals in the wild. *Science* (2021) Apr 16;372(6539):eabb5352.

H. Rossman, S. Shilo, et al., U. Shalit, E. Segal. COVID-19 dynamics after a national immunization program in Israel. *Nature Medicine* (2021), 27(6):1055-1061.

N. Bar, et al., E. Segal. A reference map of potential determinants for the human serum metabolome. *Nature* (2020), 588(7836):135-140.

H. Rossman, A. Keshet, S. Shilo, A. Gavrieli, T. Bauman, O. Cohen, E. Shelly, R. Balicer, B. Geiger, Y. Dor, E. Segal. A framework for identifying regional outbreak and spread of COVID-19 from one-minute population-wide surveys. *Nature Medicine* (2020), 26(5):634-638.

E. Blacher, et al., E. Segal*, E. Elinav*. Potential roles of gut microbiome & metabolites in modulation of murine ALS *Nature* (2019), 572(7770):474-480. * Senior authors

Career

Segal heads the Human Phenotype Project, a large-scale (more than 10,000 participants) deep-phenotype prospective longitudinal cohort and biobank that his lab established, aimed at identifying novel molecular markers with diagnostic, prognostic and therapeutic value, and at developing prediction models for disease onset and progression. The deep profiling includes medical history, lifestyle and nutritional habits, vital signs, anthropometrics, blood tests, continuous glucose and sleep monitoring, and molecular profiling of the transcriptome, genetics, gut and oral microbiome, metabolome and immune system.

Segal's analysis of this data provides novel insights into potential drivers of obesity, diabetes, and heart disease, and identifies hundreds of novel markers at the microbiome, metabolite, and immune system level. The predictive models developed can be translated into personalized disease prevention and treatment plans, and to the development of new therapeutic modalities based on metabolites and the microbiome.

Segal is a professor at the Department of Computer Science and Applied Mathematics at the Weizmann Institute of Science (WIS), heading a lab with a multi-disciplinary team of computational biologists and experimental scientists in the area of computational and systems biology. His group has extensive experience in machine learning, computational biology, and analysis of heterogeneous high-throughput genomic data.



Department of
Machine Learning



Hava Siegelmann

Adjunct Professor of Machine Learning
and **Senior Research Advisor**

Research interests

Siegelmann conducts highly interdisciplinary research in next generation machine learning, neural networks, computational studies of the brain - with application to AI, data science, and industrial/biomedical applications.

Education

- **Ph.D. in computer science** (University Fellow of Excellence) from Rutgers University, USA.
- **M.Sc. in computer science**(Cum Laude) from The Hebrew University, Israel.
- **Bachelor of arts in computer science** (Summa Cum Laude) from Technion, Israel.

Publishing

Siegelmann is a national and international expert in AI/Neural networks and computational neuroscience and as such is a published author and has almost 10,000 citations for her peer-reviewed journal articles.

H.T. Siegelmann, *Neural Networks and Analog Computation: Beyond the Turing Limit*, Birkhauser, Boston, December 1998 (book)

Dhiresha Kudithipudi and Hava T. Siegelmann, "Biological Underpinnings for Lifelong Learning Machines," *Nature Machine Intelligence*, 4, -210 (2022). <https://www.nature.com/articles/s42256-022-00452-0>

Tsuda, K. M. Tye, H. T. Siegelmann, T. J. Sejnowski, "A modeling framework for adaptive lifelong learning with transfer and savings through gating in the prefrontal cortex," *Proceedings of the National Academy of Sciences*, November 2020.

G.M. van de Ven, H. T. Siegelmann, A. S. Tolias *Brain-inspired replay for continual learning with artificial neural networks. Nature Communications*, 11, Article number: 4069, August 2020.

M. Shifrin and H.T. Siegelmann, "Near Optimal Insulin Treatment for Diabetes Patients: A machine learning approach," *Artificial Intelligence in Medicine (AIIM)*, 107, July 2020.

P. Taylor, J.N. Hobbs, J. Burrone, H.T. Siegelmann, "The global landscape of cognition: hierarchical aggregation as an organizational principle of human cortical networks and functions," *Nature Scientific Reports* Dec 2015.

P. Taylor, Z. He, N. Bilgrien, H.T. Siegelmann, "EyeFrame: real-time memory aid improves human multitasking via domain-general eye tracking procedures," *Frontiers in ICT* 2:17, Sept 2015. doi: 10.3389/fict.2015.00017

O. Loureiro, and H. Siegelmann, "Introducing an Active Cluster-Based Information Retrieval Paradigm," *Journal of the American Society for Information Science and Technology* 56(10), August 2005: 1024-1030.

Career

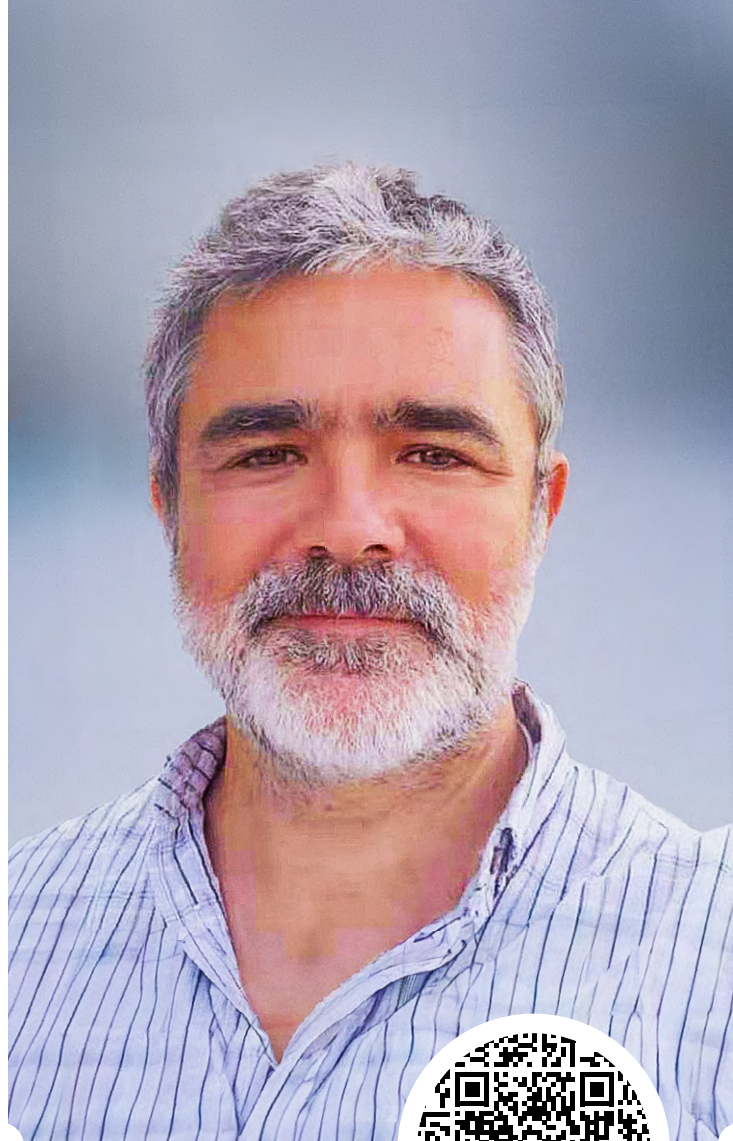
Siegelmann is an internationally known professor of computer science, and a recognized expert in neural networks. She is particularly known for introducing a new type of artificial intelligence (AI) - Lifelong Learning AI - where learning can be done during execution, and the system is not fully dependent on pre-training and batch learning. Lifelong Learning AI is founded on Siegelmann's groundbreaking work in computing beyond the Turing limit and introduction of the super-Turing computational hierarchy.

Siegelmann is a leader in increasing awareness of ethical AI and in supporting diversity in AI and STEM fields all over the world.

Prior to joining MBZUAI, she was an assistant professor at the Technion and has been a visiting professor at MIT, Harvard University, the Weizmann Institute, ETH, the Salk Institute, Mathematical Science Research Institute Berkeley, and the Newton Institute Cambridge University. She currently holds the title of University of Massachusetts Provost Professor, and serves as a core member of the Neuroscience and Behavior Program; she is a member of the university's steering committee for the Initiative of Neuroscience (IONS) and director of the Biologically Inspired Neural and Dynamical Systems (BINDS) Laboratory



Department of
Machine Learning



Michalis Vazirgiannis

Adjunct Assistant Professor
of Machine Learning

Research interests

Vazirgiannis is working in the areas of machine and deep learning models and methods for large scale heterogeneous data (including graphs and text). Part of his work is devoted to graph structured data present in many domains including biology, social networks, power/communication/transport facilities. He focuses especially on Graph Neural networks with interesting methodological contributions. This area is advancing rapidly with promising potential for many real-life applications. His latest interests center on multimodal graph generative models. Most recently, he has been working in the area of multi-modal generative AI with emphasis on graph modality with applications in synthetic data for biomedical cases.

Education

- **Ph.D. in computer science** from NKUA, Athens, Greece
- **M.Sc. in knowledge-based systems** Herriot Watt University, Edinburgh, UK

Publishing

“Path neural networks: Expressive and accurate graph neural networks”, G Michel, G Nikolentzos, JF Lutzeyer, M Vazirgiannis, International Conference on Machine Learning, 24737-24755, 2023.

“FrugalScore: Learning Cheaper, Lighter and Faster Evaluation Metrics for Automatic Text Generation”, Moussa Kamal Eddine¹, Guokan Shang^{2*}, Antoine J.-P. Tixier^{1*}, Michalis Vazirgiannis, ACL (1) 2022: 1305-1318

“BARThez: a Skilled Pretrained French Sequence-to-Sequence Model”. EMNLP (1) 2021: 9369-9390

“GraKeL: A Graph Kernel Library in Python”, Giannis Siglidis, Giannis Nikolentzos, Stratis Limnios, Christos Giatsidis, Konstantinos Skianis, Michalis Vazirgiannis; JMLR 21(54):1-5, 2020.

“Synthetic electronic health records generated with variational graph autoencoders”, G Nikolentzos, M Vazirgiannis, C Xypolopoulos, M Lingman, EG Brandt, Nature - Digital Medicine 6 (1), 83, 2023

“A Degeneracy Framework for Graph Similarity”, G Nikolentzos, P Meladianos, S Limnios, M Vazirgiannis, 2595-2601, IJCAI 2018 (best paper award)

Career

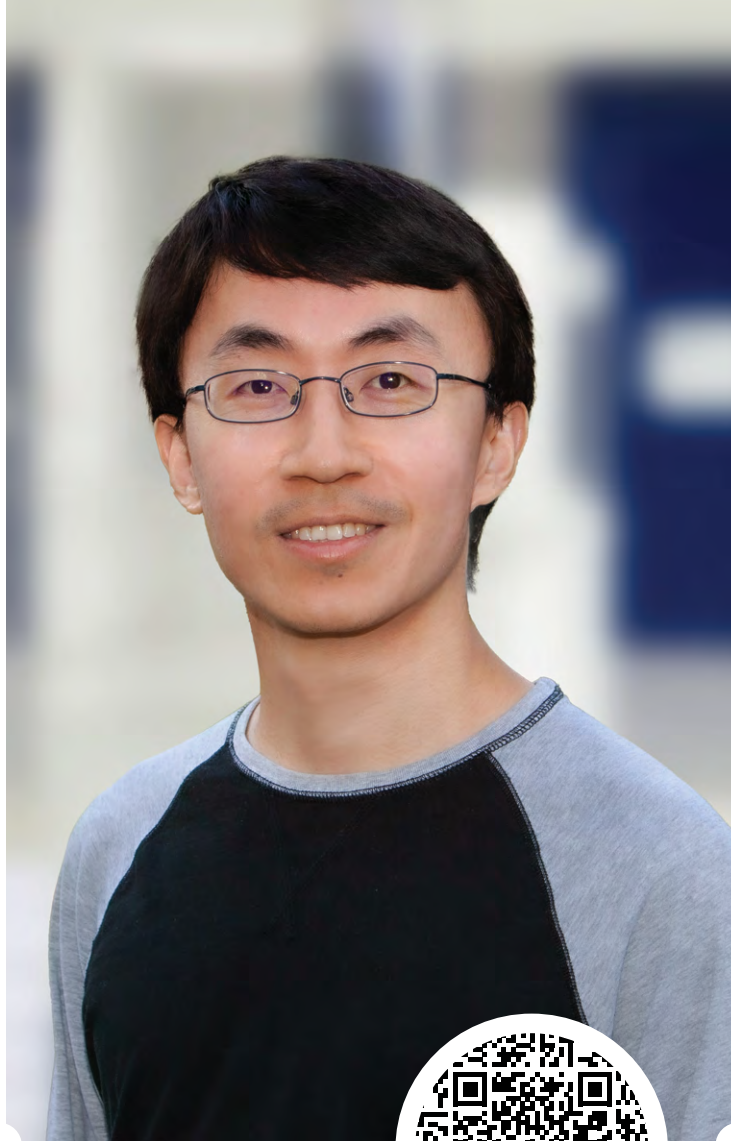
Vazirgiannis began his academic career at Athens Economic University from 1997 to 2013, laying the foundation for his enduring commitment to education and research as Professor of Informatics. Since then he was part time/on leave until 2021. From 2013, his main affiliation has been at Ecole Polytechnique in France where, since 2016, he holds a position of Distinguished Professor.

He embarked on his academic journey with post-doctoral fellowships from the TMR-Chorochronos research network, enabling visits to INRIA in Paris and Fernuni-Hagen in Germany from 1997 to 1998. Following that, he was awarded a Marie Curie Fellowship for research work in INRIA Paris from 2006 to 2008, with a thematic focus on distributed/P2P web search.

His academic pursuits continued as he became the DIGITEO Chair grant holder at LIX, Ecole Polytechnique, Paris, France, from 2010 to 2013. In 2015, he earned an AXA-funded industrial chair in “Data Science for Insurance Data,” which he held until 2018. Most recently, in 2020, he was appointed as the ANR Chair for “AML-HELAS – Advanced Machine/Deep Learning for Heterogeneous Large-scale Data,” a position he is expected to hold until 2026.



Department of
Machine Learning



Pengtao Xie

Adjunct Assistant Professor
of Machine Learning

Research interests

Xie's research interests are machine learning inspired by humans' learning skills (especially classroom learning skills), such as learning by progressive examination, interleaving learning, small-group learning, learning by teaching, etc., and their applications in healthcare as well as natural language processing.

Education

- **Ph.D. in computer science** from Carnegie Mellon University, USA.
- **Master's in computer science** from Tsinghua University, China.

Publishing

Xie has authored or co-authored more than 130 research papers with more than 3500 citations.

Xuefeng Du and Pengtao Xie. Performance-Aware Mutual Knowledge Distillation for Improving Neural Architecture Search. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2022.

Youwei Liang, Chongjian Ge, Zhan Tong, Yibing Song, Jue Wang, and Pengtao Xie. EViT: Expediting Vision Transformers via Token Reorganizations. International Conference on Learning Representations (ICLR), 2022. (Spotlight Presentation).

Sai Somayajula and Pengtao Xie. A Multi-Level Optimization Framework for End-to-End Text Augmentation. Transactions of the Association for Computational Linguistics (TACL), 2021.

Jiayuan Huang, Yangkai Du, Shuting Tao, Kun Xu, and Pengtao Xie. Structured Pretraining for Commonsense Generation. Transactions of the Association for Computational Linguistics (TACL), 2021.

Meng Zhou, Zechen Li and Pengtao Xie. Self-supervised Regularization for Text Classification. Transactions of the Association for Computational Linguistics (TACL), 2021.

Pengtao Xie, Wei Wu, Yichen Zhu, and Eric P. Xing. Orthogonality-Promoting Distance Metric Learning: Convex Relaxation and Theoretical Analysis. The 35th International Conference on Machine Learning (ICML), 2018. (Long Oral Presentation).

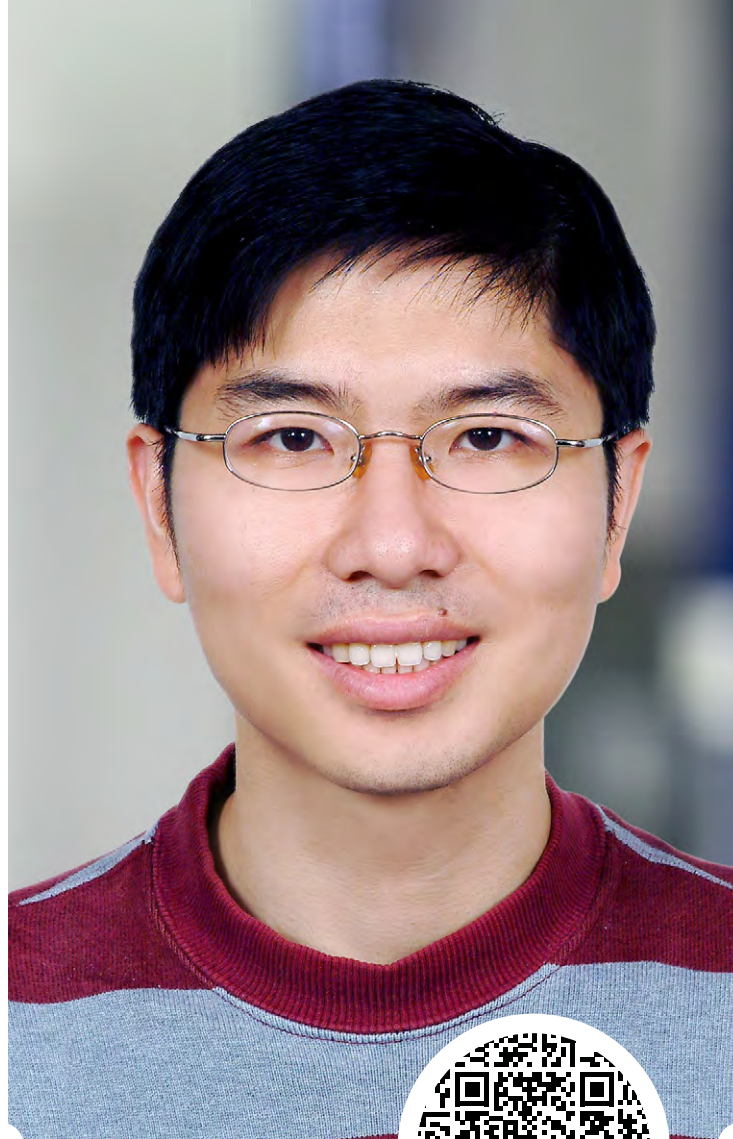
Career

Xie is an assistant professor at UC San Diego. He served as an associate vice-president at Petuum Inc. He serves as area chair for ICML, CVPR, ICCV, NAACL, etc. His Ph.D. thesis was selected as a top-5 finalist for the AMIA Doctoral Dissertation Award.

He is the recipient of the Amazon AWS Faculty Award, Tencent AI-Lab Faculty Award, Tencent WeChat Faculty Award, the Innovator Award presented by the Pittsburgh Business Times, the Siebel Scholars award. He has two granted patents and another seven under review.



Department of
Machine Learning



Chih-Jen Lin

Affiliated Professor of Machine Learning

Research interests

Lin's main research interests are the development of machine learning algorithms and software. He bridged optimization techniques and machine learning algorithms. He pioneered the construction of open-source machine learning packages and has focused a lot on the practical realization of machine learning methodology.

Education

- **Ph.D. in industrial and operations engineering** from University of Michigan, USA.
- **Master's in industrial and operations engineering** from University of Michigan, USA.
- **Bachelor in mathematics** from National Taiwan University, Taiwan.

Publishing

Lin has been a leading researcher in the field of machine learning algorithms and software design. His contributions to bridge optimization and machine learning include the creation of effective algorithms for support vector machines (SVM) and large-scale linear classification.

Li-ChungLin, Cheng-Hung Liu, Chih-Ming Chen, Kai-Chin Hsu, I-Feng Wu, Ming-Feng Tsai, and Chih-Jen On the use of unrealistic predictions in hundreds of papers evaluating graph representations. In Proceedings of the Thirty-Sixth AAAI Conference on Artificial Intelligence (AAAI), 2022.

Bowen Yuan, Yu-Sheng Li, Pengrui Quan, andChih-Jen Efficient optimization methods for extreme similarity learning with nonlinear embeddings. In Proceedings of the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD), 2021.

Yuchin Juan, Yong Zhuang, Wei-Sheng Chin, andChih-Jen Field-aware factorization machines for CTR prediction. In Proceedings of the ACM Recommender Systems Conference (RecSys), 2016.

Chih-Chung Chang andChih-Jen LIBSVM: a library for support vector machines. ACM Transactions on Intelligent Systems and Technology, 2(3):27:1-27:27, 2011.

Rong-En Fan, Kai-Wei Chang, Cho-Jui Hsieh, Xiang-Rui Wang, andChih-Jen LIBLINEAR: a library for large linear classification. Journal of Machine Learning Research, 9:1871-1874, 2008.

Chih-Wei Hsu andChih-Jen A comparison of methods for multi-class support vector machines. IEEE Transactions on Neural Networks, 13(2):415-425, 2002.

Career

Lin is currently a distinguished professor at the Department of Computer Science, National Taiwan University. He obtained his bachelor degree from National Taiwan University, Taiwan in 1993 and Ph.D. degree from University of Michigan, USA in 1998.

His major research areas include machine learning, data mining, and numerical optimization. He is best known for his work on support vector machines (SVM) for data classification. He and his team developed widely used machine learning packages including LIBSVM (a library for support vector machines) and LIBLINEAR (a library for large linear classification).

He has received many awards for his research work, including best paper awards in some top computer science conferences. He is a fellow of the Association of Advancement of Artificial Intelligence (AAAI), the Institute of Electrical and Electronics Engineers (IEEE), and the Association for Computing Machinery (ACM) for his contribution to machine learning algorithms and software design.



Department of
Machine Learning



Mingming Gong

Affiliated Associate Professor
of Machine Learning

Research interests

Gong works on the theoretical foundations and computational innovations in causal structure learning from real-world complex data. He explores causal principles to tackle challenges in machine learning, such as transferability, robustness, and interpretability. On the application side, he develops machine learning algorithms to solve real-world problems in computer vision, biomedical science, robotics, etc.

Education

- **Bachelor in electronic information science and technology** from Nanjing University, China.
- **Master's in communications and information system** from Huazhong University of Science and Technology, China.
- **Ph.D. in information technology** from University of Technology Sydney, Australia.
- **Postdoc in machine learning** from University of Pittsburgh and Carnegie Mellon University, USA.

Publishing

Gong has authored and co-authored 50-plus research papers at top conferences such as ICML, NeurIPS, UAI, CVPR, etc.

Dongting Hu, Lihua Peng, Tingjin Chu, Xiaoxing Zhang, Yinian Mao, Howard Bondell, Mingming Gong: Uncertainty Quantification in Depth Estimation via Constrained Ordinal Regression. Proceedings of European Conference on Computer Vision (ECCV), Tel Aviv, Israel, 2022.

Jian Zhang*, Jinchi Huang*, Bowen Cai*, Mingming Gong, Chaohui Wang, Jiaming Wang, Hongchen Luo, Rongfei Jia, Binqiang Zhao, Xing Tang, Huan Fu: Digging into Radiance Grid for Real-Time View Synthesis with Detail Preservation. Proceedings of European Conference on Computer Vision (ECCV), Tel Aviv, 2022.

Yanwu Xu, Shaoan Xie, Maxwell Reynolds, Matthew Ragoza, Mingming Gong*, Kayhan Batmanghelich*: Adversarial Consistency for Single Domain Generalization in Medical Image Segmentation. Proceedings of International Conference on 25th Medical Image Computing and Computer Assisted Intervention (MICCAI), Singapore, 2022.

Chaojian Yu, Bo Han, Li Shen, Jun Yu, Chen Gong, Mingming Gong, Tongliang Liu: Understanding Robust Overfitting of Adversarial Training and Beyond. Proceedings of the 38th International Conference on Machine Learning (ICML), Baltimore, Maryland, USA, 2022.

Xiaobo Xia*, Shuo Shan*, Mingming Gong, Nannan Wang, Fei Gao, Haikun Wei, Tongliang Liu: Sample-Efficient Kernel Mean Estimator with Marginalized Corrupted Data. Proceedings of SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), Washington DC, USA, 2022.

Chaojian Yu, Bo Han, Mingming Gong, Li Shen, Shiming Ge, Bo Du, Tongliang Liu: Robust Weight Perturbation for Adversarial Training. Proceedings of International Joint Conference on Artificial Intelligence (IJCAI), Messe Wien, Vienna, Austria, 2022.

Career

Gong is currently a senior lecturer at the School of Mathematics and Statistics, University of Melbourne, Australia, and a Principal Investigator at the Melbourne Centre for Data Science. He was awarded the Discovery Early Career Research Award from Australian Research Council in 2021.

He received the research excellence scholarship during his master's study at Nanjing University, China. Gong then received a university chancellor's scholarship to pursue a Ph.D. at the University of Technology Sydney. Following his Ph.D., he undertook a joint postdoc position with University of Pittsburgh and Carnegie Mellon University.

Gong has served as the area chair for top conferences such as International Conference on Machine Learning (ICML), the Conference and Workshop on Neural Information Processing Systems (NeurIPS), the International Conference on Learning Representations (ICLR), and the Conference on Uncertainty in Artificial Intelligence UAI. His research work on depth estimation won the first-prize at CVPR 2018 robust vision challenge, and his work on unsupervised domain mapping was a CVPR 2019 best paper finalist. He interned at Max Planck Institute for Intelligent Systems in German.



Department of
Machine Learning



Yuanzhi Li

Affiliated Assistant Professor
of Machine Learning

Research interests

Li's primary research area is deep learning theory, focusing on (1) understanding the hierarchical feature learning process in neural networks and how it's better than shallow learning methods; (2) how the choice of optimization algorithms affects the training speed of different types of neural networks, and how it influences the generalization of the learned solution; (3) how to use pre-trained neural networks in downstream applications more effectively.

Education

- **Ph.D. in computer science** from Princeton University, USA.
- **Bachelor of computer science and mathematics** from Tsinghua University, China.

Publishing

Li has authored or co-authored more than 50 research papers with over 5600 citations.

A convergence theory for deep learning via over-parameterization. Z Allen-Zhu, Y Li, Z Song. International Conference on Machine Learning, 242-252, 2019.

Learning and generalization in overparameterized neural networks, going beyond two layers. Z Allen-Zhu, Y Li, Y Liang. Advances in neural information processing systems 32, 2019.

Convergence analysis of two-layer neural networks with relu activation. Y Li, Y Yuan. Advances in neural information processing systems 30, 2017.

Learning overparameterized neural networks via stochastic gradient descent on structured data. Y Li, Y Liang. Advances in Neural Information Processing Systems 31, 2018.

A theoretical analysis of NDCG ranking measures. Y Wang, L Wang, Y Li, D He, W Chen, TY Liu. Proceedings of the 26th annual conference on learning theory (COLT 2013) 8, 6, 2013.

Career

Prior to joining MBZUAI, Li was a postdoctoral researcher at Stanford and is an assistant professor in the Carnegie Mellon University (CMU) Department of Machine Learning.

In 2023, Li was selected for a prestigious Sloan Research Fellowship in computer science by the Alfred P. Sloan Foundation. The Fellowship is awarded in honor of extraordinary researchers whose creativity, innovation, and research accomplishments make them stand out as the next generation of leaders.

The fellowship recognizes creative, early-career researchers in seven scientific and technical fields: chemistry, computer science, Earth system science, economics, mathematics, neuroscience and physics. Li was one of only 22 scholars selected in computer science for 2023.

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NLP

Department of
**Natural Language
Processing**



Preslav Nakov

Department Chair
of Natural Language Processing and
Professor of Natural Language Processing

Research interests

Nakov's research interests include computational linguistics and natural language processing, disinformation, propaganda, fake news and media bias detection, fact checking, machine translation, question answering, sentiment analysis, lexical semantics, and biomedical text processing..

Education

- **Ph.D. in computer science** from the University of California at Berkeley, USA. (Fulbright scholarship and UC Berkeley fellowship).
- **Diploma (M.Sc. and B.Sc.) in informatics** from Sofia University (St Kliment Ohridski), Bulgaria.

Publishing

Nakov has published more than 250 research papers in top-tier conferences and journals, and he was named among the top 2% of the world's most-cited researchers in the career achievement category, part of a global list by Stanford University.

The Spread of Propaganda by Coordinated Communities on Social Media. Kristina Hristakieva, Stefano Cresci, Giovanni Da San Martino, Mauro Conti, Preslav Nakov. *WebSci 2022*, pp. 191-201 (best paper award at ACM WebSci'2022)

Detecting Propaganda Techniques in Memes. Dimitar Dimitrov, Bishr Bin Ali, Shaden Shaar, Firoj Alam, Fabrizio Silvestri, Hamed Firooz, Preslav Nakov, Giovanni Da San Martino - *ACL-IJCNLP'2021*

A Neighbourhood Framework for Resource-Learn Content Flagging. Sheikh Muhammad Sarwar, Dimitrina Zlatkova, Momchil Hardalov, Yoan Dinkov, Isabelle Augenstein, Preslav Nakov. *Transactions of the Association for Computational Linguistics*, 10:484-502 – *TACL journal*

RuleBert: Teaching Soft Rules to Pre-trained Language Models. Mohammed Saeed, Naser Ahmadi, Preslav Nakov, Paolo Papotti. *Proceedings of the 2021 Conference on Empirical Methods in Natural Language Processing*, pp.1460-1476 – *EMNLP'2021*

We Can Explain Your Research in Layman's Terms: Towards Automating Science Journalism at Scale. Rumen Dangovski, Michelle Shen, Dawson Byrd, Li Jing, Desislava Tsvetkova, Preslav Nakov, Marin Soljagic. 35(14), 12728-12737 – *AAAI'2021*

Semantic Relations Between Nominals. Vivi Nastase, Stan Szpakowicz, Preslav Nakov, Diarmuid Ó Séaghdha. *Synthesis Lectures on Human Language Technologies*, Morgan & Claypool Publishers 2021, pp. 1-234 – book

Career

Prior to joining MBZUAI, Nakov worked at the Qatar Computing Research, HBKU where he was a principal scientist. Previously, he was a research fellow at the National University of Singapore (2008– 2011) and a researcher at the Bulgarian Academy of Sciences (2008). He has been an honorary lecturer at Sofia University, Bulgaria since 2014.

Nakov authored a Morgan and Claypool book titled *Semantic Relations Between Nominals* (2nd edition in 2021) and two books on computer algorithms. He was also the first to receive the Bulgarian President's John Atanasoff award, named after the inventor of the first automatic electronic digital computer.

Nakov is one of the leading experts on “fake news”, disinformation, fact checking, propaganda, and media bias detection and has published tens of research papers on solutions and stop-gaps for the evergrowing online social media infodemic.

He's served on the program committees of the major conferences in computational linguistics and artificial intelligence. Most recently, he was a program committee chair of the annual conference of the Association for Computational Linguistics (ACL 2022). His research has been featured in more than 100 news outlets, including MIT Technology Review, Communications of the ACM (Research Highlights), Forbes, Boston Globe, Science Daily, Popular Science, Fast Company, The Register, WIRED, and Engadget.

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Department of
**Natural Language
Processing**



Ted Briscoe

Deputy Department Chair
of Natural Language Processing and
Professor of Natural Language Processing

Research interests

Briscoe has worked on statistical and robust parsing algorithms, computational approaches to lexicon acquisition and to representation of lexical, syntactic and semantic knowledge, textual information extraction from scientific articles and regulatory documents, models of human language learning and processing, and evolutionary models of language development and change. His recent work has mostly focussed on NLP and ML techniques in support of language learning.

Education

- **Ph.D. in computational linguistics** from University of Cambridge, England.
- **Master's in linguistics** from University of Cambridge, England
- **Bachelor of linguistics/philosophy/English** from University of Lancaster, England

Publishing

Briscoe is the (co-)author of more than 150 internationally peer-reviewed research papers and three books on topics in natural language processing and computational linguistics, and of one patent on automated assessment of exam scripts.

Language learning, power laws, and sexual selection, T Briscoe, *Mind & Society* 7 (1), 65-76, 2008

The second release of the RASP system, T Briscoe, J Carroll, R Watson, *Proc. of the COLING/ACL*, 2006

Grammatical Error Correction: A Survey of the State of the Art, C Bryant, Z Yuan, MR Qorib, H Cao, HT Ng, T Briscoe, *Computational Linguistics*, submitted, 2022

Neural automated essay scoring and coherence modeling for adversarially crafted input, Y Farag, H Yannakoudakis, T Briscoe, *Proc. of Nth Am. ACL*, 2018

Developing an automated writing placement system for ESL learners, H Yannakoudakis, ØE Andersen, A Geranpayeh, T Briscoe, D Nicholls, *Applied Measurement in Education* 31 (3), 251-267, 2018

Grammatical error correction using neural machine translation, Z Yuan, T Briscoe, *Proc. of Nth Am. ACL*, 2016

Career

Before joining MBZUAI, Briscoe was Professor of Computational Linguistics at the University of Cambridge where he was a member of faculty for 33 years. He led the Natural Language and Information Processing (NLIP) research group in the Department of Computer Science and Technology for more than 20 years, and was co-founder and inaugural director of the university's interdisciplinary Automated Language Teaching and Assessment (ALTA) Institute.

In 2003, he co-founded iLexIR Ltd, a NLP consultancy and technology provider, and was its CEO until 2022. In 2013, he co-founded English Language iTutoring and was its chief scientist until 2019, and from 2020 until 2022 he was chief scientist for RegGenome Ltd. He has been an area chair for five conferences of the Association of Computational Linguistics (ACL) and served on the programme committees of many more ACL conferences and workshops, as well as of EMNLP, COLING, CoNLL, LREC and EVOLANG.

Briscoe has been principal investigator on 16 externally funded UK and European research grants, taught at four European Summer Schools, and been a technical advisor or consultant to more than a dozen companies. He currently advises Cambridge Innovation Capital on investment in the AI/ML/NLP space. He has presented his research in invited talks at conferences and workshops at more than 30 events.



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Thamar Solorio

Professor of Natural Language Processing

Research interests

Solorio's research focuses on information extraction (structured prediction) problems, multilingual models, with a special emphasis on mixed language settings, low resource NLP, and more recently, multimodal content understanding.

Education

- **Ph.D. in computer science**, National Institute of Astrophysics, Optics and Electronics, in Puebla, Mexico.
- **Master's in computer science**, National Institute of Astrophysics, Optics and Electronics, in Puebla, Mexico.
- **Bachelor of Science in computer systems engineering**, Autonomous University of Chihuahua, Chihuahua, Mexico.

Publishing

She has coauthored more than 200 publications in a wide range of NLP topics:.

L. Fernando Pardo-Sixtos, A. Pastor López-Monroy, Mahsa Shafaei, and Tamar Solorio. Hierarchical attention and transformers for automatic movie rating. *Expert Systems with Applications*, 209:118164, 2022.

Siva Uday Sampreeth Chebolu, Paolo Rosso, Sudipta Kar, and Tamar Solorio. Survey on aspect category detection. *ACM Comput. Surv.*, May 2022. 2022

Shuguang Chen, Leonardo Neves, and Tamar Solorio. Style transfer as data augmentation: A case study on named entity recognition. In *EMNLP 2022*.

Genta Winata, Shijie Wu, Mayank Kulkarni, Tamar Solorio, and Daniel Preotiuc-Pietro. Cross-lingual few-shot learning on unseen languages. In *AAACL IJCNLP 2022, Virtual*. Association for Computational Linguistics.

Shuguang Chen, Gustavo Aguilar, Leonardo Neves, and Tamar Solorio. Data augmentation for cross-domain named entity recognition. In *Proceedings of the 2021 Conference on Empirical Methods in Natural Language Processing*, pages 5346–5356, Online and Punta Cana, Dominican Republic, November 2021. Association for Computational Linguistics.

Yigeng Zhang, Mahsa Shafaei, Fabio Gonzalez, and Tamar Solorio. From none to severe: Predicting severity in movie scripts. In *Findings of the Association for Computational Linguistics: EMNLP 2021*, pages 3951–3956, Punta Cana, Dominican Republic, November 2021. Association for Computational Linguistics.

Career

Prior to joining MBZUAI, Solorio was a Professor of Computer Science at the University of Houston (UH) and the Director and Founder of the RiTUAL Lab at UH. She holds graduate degrees in computer science from the Instituto Nacional de Astrofísica, Óptica y Electrónica, in Puebla, Mexico. Solorio received an NSF CAREER award for her work on authorship attribution in 2014 – a very prestigious award for young investigators from the National Science Foundation. She is also a recipient of the 2014 Emerging Leader ABIE Award in Honor of Denice Denton. She is currently serving a second term as an elected board member of the North American Chapter of the Association of Computational Linguistics and was PC co-chair for NAACL 2019. She is also co-Editor-in-Chief for the ACL Rolling Review (ARR) system and member of the ARR advisory board. Solorio has a US patent awarded in 2022 for her work on recommendation systems for books. Before joining UH, she was an Assistant Professor at the University of Alabama at Birmingham.

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Alham Fikri Aji

Assistant Professor
of Natural Language Processing

Research interests

Aji explores efficient NLP through model compression and distillation, and NLP for under-resourced languages. This involves dataset curation/ construction, data-efficient learning/adaptation, zero-shot approaches, or building multilingual language models. He is currently active in Indonesian and South-East Asian NLP researcher communities.

Education

- **Ph.D. in computational linguistics** from University of Edinburgh, Scotland.
- **Master's in artificial intelligence** from University of Edinburgh, Scotland.
- **Bachelor of computer science** from Universitas Indonesia, Indonesia.

Publishing

Aji's fields of interest include deep learning, computational linguistic, machine translation, efficient and distributed machine learning, low-resource NLP, multilingual NLP, and data construction.

Alham Fikri Aji, Genta Indra Winata, Fajri Koto, Samuel Cahyawijaya, Ade Romadhony, Rahmad Mahendra, Kemal Kurniawan, David Moeljadi, Radityo Eko Prasajo, Timothy Baldwin, Jey Han Lau, Sebastian Ruder. "One Country, 700+ Languages: NLP Challenges for Underrepresented Languages and Dialects in Indonesia". ACL, 2022

Priyanka Sen, Alham Fikri Aji, Amir Saffari. "Mintaka: A Complex, Natural, and Multilingual Dataset for End-to-End Question Answering". COLING, 2022

Rahmad Mahendra, Alham Fikri Aji, Samuel Louvan, Fahrurrozi Rahman, Clara Vania. "IndoNLI: A Natural Language Inference Dataset for Indonesian". EMNLP, 2021

Alham Fikri Aji, Nikolay Bogoychev, Kenneth Heafield, Rico Sennrich. "In Neural Machine Translation, What Does Transfer Learning Transfer?". ACL, 2020

Marcin Junczys-Dowmunt, Roman Grundkiewicz, Tomasz Grundkiewicz, Hieu Hoang, Kenneth Heafield, Tom Neckermann, Frank Seide, Ulrich Germann, Alham Fikri Aji, Nikolay Bogoychev, Andre Martins, Alexandra Birch. "Marian: Fast neural machine translation in C++". ACL, 2018

Alham Fikri Aji, Kenneth Heafield. "Sparse communication for distributed gradient descent". EMNLP, 2017

Career

Prior to joining MBZUAI, Aji was an applied research scientist at Amazon. He was a postdoctoral fellow at the Institute for Language, Cognition and Computation at the University of Edinburgh. During his postdoctoral and Ph.D., he has contributed to efficient NMT-related projects, such as Marian: a fast NMT framework and browser-based translation without using the cloud.

Aside from efficient NLP, he is now interested in developing datasets and systems for multilingual NLP especially for under-resourced languages. Aji also co-initiated IndoNLP, a community-based movement to enable and advance NLP research for Indonesian languages.

Before getting into the world of AI and NLP, Aji was active in competitive programming. He won a silver medal representing Indonesia in the 2010 International Olympiad of Informatics. He also worked in several well-known industries such as Apple (language engineer, 2015), Google (intern, 2017), and finally at Amazon (applied scientist, 2021). He also worked at a start-up in Indonesia which is engaged in conversational AI.

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Hanan Al Darmaki

Assistant Professor
of Natural Language Processing

Research interests

Al Darmaki's works on natural language processing (NLP) and automatic speech recognition (ASR) for low-resource languages. The methods she explores include unsupervised learning, transfer learning, and distant supervision to adapt NLP and ASR models to languages and dialects for which labeled data are scarce or non-existent. This includes studying the regularities in text and speech patterns to discover and map terms across languages or modalities, such as unsupervised dictionary induction, cross-lingual embeddings of speech and text, and unsupervised speech-to-text mapping.

Education

- **Ph.D. in computer science** from The George Washington University, USA.
- **Master of Philosophy in computer speech, text, and internet technology (CSTIT)** from University of Cambridge, UK.
- **Bachelor of Science in computer engineering** from American University of Sharjah, UAE

Publishing

Al Darmaki's current research activities include natural language processing (NLP) and automatic speech recognition (ASR) for low-resource languages. In particular, she works on developing unsupervised methods to enable transfer learning to languages and dialects for which labeled data are scarce or non-existent.

"Unsupervised Automatic Speech Recognition: A Review". *Speech Communication*, 2022 – Elsevier.

"Efficient Sentence Embedding using Discrete Cosine Transform". *Proceedings of the 2019 Conference on Empirical Methods in Natural Language Processing (EMNLP)*.

"Scalable Cross-Lingual Transfer of Neural Sentence Embeddings". *Proceedings of the Joint Conference on Lexical and Computational Semantics (*SEM)*, 2019.

"Context-Aware Cross-Lingual Mapping". *Proceedings of the Annual Conference of the North American Chapter of the Association for Computational Linguistics (NAACL)*, 2019.

"Evaluation of Unsupervised Compositional Representations". *Proceedings of the 27th International Conference on Computational Linguistics (COLING)*, 2018.

"Unsupervised Word Mapping Using Structural Similarities in Monolingual Embeddings". *Transactions Of The Association For Computational Linguistics (TACL)*, 2018.

Career

Prior to joining MBZUAI, Al Darmaki was an assistant professor in the department of computer science and software engineering at UAE University (UAEU). While completing her Ph.D., she worked as a teaching assistant and lecturer at George Washington University as well as on research projects at Apple Inc. and Amazon Web Services as an intern.

Before starting her Ph.D., she worked as a statistical analyst at the Statistics Center-Abu Dhabi (SCAD), and as a network engineer at Dubai Electricity and Water Authority.

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Yova Kementchedjhieva

Assistant Professor
of Natural Language Processing

Research interests

Kementchedjhieva's research concerns language generation in multimodal and cross-lingual contexts. She is interested in knowledge grounding and transfer learning, most recently in the area of vision-and-language processing.

Education

- **Ph.D. in computer science** from the University of Copenhagen.
- **Master of Science in cognitive science** from the University of Edinburgh.
- **Master of Arts (equivalent to B.Sc.) in linguistics** from the University of Edinburgh.

Publishing

Rita Ramos, Bruno Martins, Desmond Elliott, Yova Kementchedjhieva. SmallCap: lightweight image captioning prompted with retrieval augmentation. In Proceedings of CVPR 2023.

Yova Kementchedjhieva & Ilias Chalkidis. An Exploration of Encoder-Decoder Approaches to Multi-Label Classification for Legal and Biomedical Text. In Findings of ACL 2023.

Yova Kementchedjhieva, Anders Søgaard. Grammatical Error Correction through Round-Trip Machine Translation. In Findings of EACL 2023.

Mareike Hartmann, Miryam de Lhoneux, Daniel Hershcovich, Yova Kementchedjhieva, Lukas Nielsen, Chen Qiu, Anders Søgaard. A Multilingual Benchmark for Probing Negation-Awareness with Minimal Pairs. In Proceedings of CoNLL 2021.

Career

Prior to joining MBZUAI, Kementchedjhieva was a postdoctoral researcher in the department of computer science at the University of Copenhagen. During her time at the University of Copenhagen, she worked on conditional text generation across a range of tasks, including grammatical error correction, dialog generation and image captioning. Her earlier work concerned multilingual natural language processing, with a focus on cross-lingual embedding alignment. While at Copenhagen, she also worked as a teaching assistant, gave lectures for beginner and advanced NLP courses, and interned at Google LLC. and DataMinr in a researcher capacity.



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Ekaterina Kochmar

Assistant Professor
of Natural Language Processing

Research interests

Kochmar's research has spanned the areas of author profiling, models of computational semantics, readability assessment, language complexity, text simplification, summarization, language testing and assessment, and error detection and correction. She is particularly interested in applications of machine learning and AI techniques to the educational domain, including models of second language learning, and assessment and dialogue-based intelligent tutoring systems.

Education

- **Ph.D. in computer science** from the University of Copenhagen.
- **Master of Science in cognitive science** from the University of Edinburgh.
- **Master of Arts (equivalent to B.Sc.) in linguistics** from the University of Edinburgh.

Publishing

Kochmar has (co-)authored more than 30 internationally peer-reviewed research papers and published a book titled *Getting Started with Natural Language Processing* in 2022.

Ekaterina Kochmar (2022). *Getting Started with Natural Language Processing*. Manning Publications, ISBN 9781617296765

Devang Kulshreshtha, Muhammad Shayan, Robert Belfer, Siva Reddy, Iulian Vlad Serban, and Ekaterina Kochmar (2022). Few-shot Question Generation for Personalized Feedback in Intelligent Tutoring Systems. In *Proceedings of the 11th International Conference on Prestigious Applications of Intelligent Systems (PAIS 2022)*

Ekaterina Kochmar, Dung Do Vu, Robert Belfer, Varun Gupta, Iulian Vlad Serban, and Joelle Pineau (2021). Automated Generation of Personalized Pedagogical Interventions in Intelligent Tutoring Systems. In *International Journal of Artificial Intelligence in Education (IJAIED)*

Sian Gooding, Ekaterina Kochmar, Seid Muhie Yimam, and Chris Biemann (2021). Word Complexity is in the Eye of the Beholder. In *Proceedings of the 2021 Conference of the North American Chapter of the Association for Computational Linguistics - Human Language Technologies (NAACL-HLT 2021)*

Matt Grenander, Robert Belfer, Ekaterina Kochmar, Iulian Serban, François St-Hilaire, and Jackie Cheung (2021). Deep Discourse Analysis for Generating Personalized Feedback in Intelligent Tutor Systems. In *Proceedings of the 11th Symposium on Educational Advances in Artificial Intelligence (EAAI-21)*

Career

Prior to joining MBZUAI, Kochmar worked as a Lecturer at the Department of Computer Science of the University of Bath (2021–2023) where she was part of the AI research group. Prior to that, she was a postdoctoral researcher at the ALTA (Automated Language Teaching and Assessment) Institute at University of Cambridge focusing on the development of educational applications for second language learners.

She conducts research at the intersection of artificial intelligence, natural language processing, and intelligent tutoring systems. Her research contributed to the building of Read & Improve, a readability tool for non-native readers of English, and to the building of Korbi, a dialogue-based intelligent tutoring system capable of providing learners with high-quality, interactive and personalized education in STEM subjects.

Kochmar is a co-founder and the chief scientific officer of Korbit AI, focusing on building an AI-powered dialogue-based tutoring system capable of providing learners with high-quality, interactive, and personalized education in STEM subjects.

Kochmar is the President of the ACL Special Interest Group on Educational Applications (SIGEDU), and of the International Alliance to Advance Learning in the Digital Era (IAALDE). She is an area chair in NLP Applications for ACL 2023 and an action editor for the ACL Rolling Review; prior to that she served as an area chair for EMNLP 2022 and ACL 2023, and was part of the programme committees of the top-ranked international conferences in the field, including ACL, NAACL, EMNLP, AAAI, COLING, BEA, LREC, *SEM, as well as multiple ACL workshops.

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Kentaro Inui

Visiting Professor
of Natural Language Processing

Research interests

Inui's research encompasses a broad spectrum of NLP domains, primarily focusing on the computational modeling of semantics and discourse, knowledge-intensive reasoning for language comprehension, and trustworthiness in large language models. He also has a keen interest in the educational aspects of NLP applications, conducting research in areas such as explainable automated writing evaluation and argumentation diagnosis.

Education

- **Ph.D. in computer science** from the Tokyo Institute of Technology, Japan.
- **Master of Engineering in computer science** from the Tokyo Institute of Technology, Japan.

Publishing

Hiroaki Funayama, Yuya Asazuma, Yuichiroh Matsubayashi, Tomoya Mizumoto, Jun Suzuki and Kentaro Inui. Reducing the Cost: Cross-Prompt Pre-Finetuning for Short Answer Scoring. The 24th International Conference on Artificial Intelligence in Education (AIED 2023), pp.78–89, 2023.

Keito Kudo, Yoichi Aoki, Tatsuki Kuribayashi, Ana Brassard, Masashi Yoshikawa, Keisuke Sakaguchi and Kentaro Inui. Do Deep Neural Networks Capture Compositionality in Arithmetic Reasoning? In Proceedings of the 17th Conference of the European Chapter of the Association for Computational Linguistics (EACL 2023), pp.1343–1354, 2023.

Yuko Tanaka, Miwa Inuzuka, Hiromi Arai, Yoichi Takahashi, Mino Kukita and Kentaro Inui. Who Does Not Benefit from Fact-Checking Websites? A Psychological Characteristic Predicts the Selective Avoidance of Clicking Uncongenial Facts. In Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems (CHI 2023), pp.1–17, 2023.

Qin Dai, Benjamin Heinzerling, Kentaro Inui. Cross-stitching Text and Knowledge Graph Encoders for Distantly Supervised Relation Extraction. In Proceedings of the 2022 Conference on Empirical Methods in Natural Language Processing (EMNLP 2022), 15 pages, 2022.

Tatsuki Kuribayashi, Yohei Oseki, Ana Brassard, Kentaro Inui. Context Limitations Make Neural Language Models More Human-Like. In Proceedings of the 2022 Conference on Empirical Methods in Natural Language Processing (EMNLP 2022), 16 pages, 2022.

Goro Kobayashi, Tatsuki Kuribayashi, Sho Yokoi and Kentaro Inui. Incorporating Residual and Normalization Layers into Analysis of Masked Language Models. In Proceedings of the 2021 Conference on Empirical Methods in Natural Language Processing (EMNLP 2021), pp.4547–4568, 2021.

Career

Before joining MBZUAI, Kentaro Inui led the Natural Language Processing Lab at Tohoku University, Japan, for 13 years. He also directed the Natural Language Understanding Team at the RIKEN Center for the Advanced Intelligence Project. While he maintains strong ties with both institutions, Kentaro's primary commitment now lies with MBZUAI. He began his career as an Assistant Professor at Tokyo Institute of Technology in 1995. Subsequently, he served as an Associate Professor at Kyushu Institute of Technology and Nara Institute of Science and Technology and as a visiting researcher at the University of Sussex, before joining Tohoku University in 2010. During his career, Kentaro has served as the editor-in-chief of the Journal of Information Processing and the Journal of Natural Language Processing. He also took on the role of General Chair for EMNLP-IJCNLP 2019 and is currently the Chairperson of the Association for Natural Language Processing in Japan.

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Bhiksha Raj

Visiting Professor
of Natural Language Processing

Research interests

Raj's current research spans topics of high contemporary importance in addition to his work on speech, such as exploiting data and structure redundancy for deep learning and AI systems, preserving user privacy in speech and audio processing systems, learning and evaluating classifiers under real-world labeling assumptions, and robustness of AI systems to adversarial attacks.

Education

- **Ph.D. in electrical engineering and computer science**
from Carnegie Mellon University, USA

Career

Raj has joined MBZUAI as a Visiting Professor of Natural Language Processing. He is a tenured professor of computer science at Carnegie Mellon University (CMU). He was at Compaq (Cambridge) Research Lab until 2001. From 2001 to 2008, he led speech research at Mitsubishi Electric Research Labs in Cambridge MA. Since 2008, he has been a full-time faculty member at CMU.

During his career, Raj has made pioneering contributions to three broad areas of research: speech and audio processing, privacy, and security in speech processing, and most recently, deep learning and AI. He holds more than 30 patents

in these areas, is co-editor of three technical books and has published more than 400 research papers on these topics. He is a fellow of the IEEE.

He has served on advisory boards or been advisor for several multinational companies, including Callminer Inc., Amazon Inc., etc., in addition to various startups. He has also consulted for Walt Disney Research, Adobe Research, US Navy, US Air Force, the Federal Aviation Authority, Mitsubishi Electric Research Labs and others. Raj has co-founded two (now-dissolved) startups.

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Muhammad Abdul-Mageed

Visiting Professor

of Natural Language Processing and Machine Learning

Research interests

Abdul-Mageed's research focuses on deep representation learning and natural language socio-pragmatics, with two main goals: (1) development of 'social' machines for improved human health, safer social networking, and reduced information overload; and (2) use of machine learning as a vehicle for making discoveries with and about human language.

Education

- **Double Ph.D. in computational linguistics and information science** from Indiana University Bloomington, USA.
- **Master's in computational linguistics** from Indiana University Bloomington, USA.

Publishing

In terms of citations, as of mid-February 2023, his Google Scholar profile scores are as follows: more than 3000 citations, an h-index at 24, and an i10-index at 47.

Adebara, I., Elmadany, A., Abdul-Mageed, M., & Alcoba, A. (2022). AfroLID: A Neural Language Identification Tool for African Languages. In Proceedings of The 2022 Conference on Empirical Methods in Natural Language Processing (EMNLP 2022). [link]

Nagoudi, E., Elmadany, A. & Abdul-Mageed, M. (2022). AraT5: Text-to-Text Transformers for Arabic Language Understanding and Generation. In Proceedings of the 60th Annual Meeting on Association for Computational Linguistics (ACL 2022). [link]

Adebara, I., & Abdul-Mageed, M. (2022). Towards Afrocentric NLP for African Languages: Where We Are and Where We Can Go. In Proceedings of the 60th Annual Meeting on Association for Computational Linguistics (ACL 2022). [link]

Jawahar, G., Abdul-Mageed, M., & Lakshmanan, L. V. (2022). Automatic Detection of Entity-Manipulated Text using Factual Knowledge. In Proceedings of the 60th Annual Meeting on Association for Computational Linguistics (ACL 2022). [link]

Nagoudi, E., Elmadany, A., & Abdul-Mageed, M. (2022). TURJUMAN: A Public Toolkit for Neural Arabic Machine Translation. In Proceedings of The 5th Workshop on Open-Source Arabic Corpora and Processing Tools (LREC 2022). (Best paper award). [link]

Abdul-Mageed, M., Elmadany, A., & Nagoudi, E. (2021). ARBERT & MARBERT: Deep Bidirectional Transformers for Arabic. In Proceedings of the 59th Annual Meeting on Association for Computational Linguistics (ACL 2021). [link]

Career

Abdul-Mageed maintains an associate professor and a Canada research chair in natural language processing (NLP) and machine learning at the University of British Columbia (UBC), where he is a founding member of UBC's Center for Artificial Intelligence.

Abdul-Mageed's research program focuses on deep representation learning and natural language socio-pragmatics, with a goal to innovate more equitable, efficient, and 'social' machines for improved human health, safer social networking, and reduced information overload. He also has a special focus on Arabic NLP. Applications of Abdul-Mageed's work currently span a wide range of speech and language understanding and generation tasks. For example, his group works on language models, automatic speech processing, machine translation, and computational socio-pragmatics in social media.

Before UBC and MBZUAI, Abdul-Mageed held multiple positions including a research scientist at an undisclosed startup, a visiting scholar at the University of Pennsylvania (2016-2018), a visiting assistant professor at the School of Informatics and Computing at Indiana University (2015-2016), and a visiting scholar at Center for Computational Learning Systems at Columbia University (2010-2012). His research has been funded by Advanced Micro Devices Inc (AMD), Amazon, Google, Natural Sciences and Engineering Research Council of Canada, Social Sciences and Humanities Research Council of Canada, and Canadian Foundation for Innovation. Abdul-Mageed has three US patents.

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Iryna Gurevych

Adjunct Professor

of Natural Language Processing

Research interests

Gurevych's main research interests are in machine learning for large-scale language understanding and text semantics, including multilingual representation learning and argument mining.

Education

- **Ph.D. in computational linguistics** from University of Duisburg-Essen, Germany.
- **Diploma (distinction) in English and German linguistics** from State University of Vinnytsia, Ukraine.

Publishing

Selected publications:

Iryna Gurevych, Michael Kohler and Gözde Gül Şahin. On the Rate of Convergence of a Classifier Based on a Transformer Encoder. In: IEEE Transactions on Information Theory, 68, Nr. 12, 2022, pp. 8139–8155.

Ilya Kuznetsov, Jan Buchmann, Max Eichler and Iryna Gurevych. Revise and Resubmit: An Intertextual Model of Text-based Collaboration in Peer Review. In: Computational Linguistics, Vol. 48, Nr. 4, 2022, pp. 949–986.

Gregor Geigle, Jonas Pfeiffer, Nils Reimers, Ivan Vulić and Iryna Gurevych. Retrieve Fast, Rerank Smart: Cooperative and Joint Approaches for Improved Cross-Modal Retrieval. In: Transactions of the Association for Computational Linguistics, Vol. 10, 2022, pp. 503–521.

Ji-Ung Lee, Jan-Christoph Klie and Iryna Gurevych. Annotation Curricula to Implicitly Train Non-Expert Annotators. In: Computational Linguistics, Vol. 48, Nr. 2, 2022, pp. 343–373.

Michael Bugert, Nils Reimers and Iryna Gurevych. Generalizing cross-document event coreference resolution across multiple corpora. In: Computational Linguistics, 47, Nr. 3, 2021, pp. 575–614.

Iryna Gurevych, Judith Eckle-Kohler, and Michael Matuschek. Linked Lexical Knowledge Bases: Foundations and Applications. Synthesis Lectures on Human Language Technologies. Morgan & Claypool Publishers, July 2016. ISBN: 9781627059749.

Career

Gurevych is professor of computer science and founder/director of the Ubiquitous Knowledge Processing (UKP) Lab at the Technical University (TU) of Darmstadt, Germany (40 full-time researchers). Gurevych's outstanding work has received numerous awards. Examples are the ACL fellow award 2020 and the ever-first Hessian LOEWE Distinguished Chair award (2.5 million Euro) in 2021. Gurevych is co-director of the NLP program within ELLIS, a European network of excellence in machine learning. In 2023, she has become the president of the Association of Computational Linguistics (ACL).

In 2022, Gurevych was awarded one of the highly-coveted “ERC Advanced Grants” of 2.5 million euros from the European Research Council (ERC) for her project “InterText – Modeling Text as a Living Object in a Cross-Document Context”. The InterText project is creating the first-ever framework for exploring intertextuality in NLP. InterText develops conceptual and applied models and datasets for the study of inline commentary, implicit linking, and document versioning. The models are evaluated in two case studies involving academic peer review and conspiracy theory debunking.

Gurevych's research contributes to NLP by providing efficient and effective NLP techniques that build on top of large language models, such as multilingual sentence embeddings or adapters. This allows to process and understand many languages, including the ones with few resources. In addition, her research removes critical limitations of current NLP which is unable to understand fine-grained relations between long and complex texts in context.

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Veselin Stoyanov

Adjunct Professor
of Natural Language Processing

Research interests

Stoyanov's research interests relate to large language models, including pretraining, fine-tuning related to instruction following and application that are designed to solve real-world problems. He is also interested in efficient, sparsely activated models such as mixtures of experts (MoE) as well as multilingual LLMs and training models for performing tasks cross-lingually. He is seeking to develop new paradigms for applying LLMs in real-world, interactive scenarios that augment the creative process, while allowing people to be more efficient..

Education

- **Ph.D. in computational linguistics** from University of Duisburg-Essen, Germany.
- **Diploma (distinction) in English and German linguistics** from State University of Vinnytsia, Ukraine.

Publishing

A Ni, S Iyer, D Radev, V Stoyanov, W Yih, S Wang, XV Lin. Lever: Learning to verify language-to-code generation with execution. International Conference on Machine Learning, 2023.

P Hase, M Diab, A Celikyilmaz, X Li, Z Kozareva, V Stoyanov, M Bansal, S Iyer. Methods for Measuring, Updating, and Visualizing Factual Beliefs in Language Models, Proceedings of the 17th Conference of the European Chapter of the Association for Computational Linguistics, 2023.

A Halevy, C Canton-Ferrer, H Ma, U Ozertem, P Pantel, M Saeidi, F Silvestri, V Stoyanov. Preserving integrity in online social networks, Communications of the ACM, 2022.

B Gunel, J Du, A Conneau, V Stoyanov. Supervised Contrastive Learning for Pre-trained Language Model Fine-tuning, <https://arxiv.org/pdf/2011.01403.pdf>, 2021.

A Conneau, K Khandelwal, N Goyal, V Chaudhary, G Wenzek, F Guzmán, E Grave, M Ott, L Zettlemoyer, V Stoyanov. Unsupervised Cross-lingual Representation Learning at Scale, <https://arxiv.org/pdf/1911.02116.pdf>, 2020.

A Conneau, S Wu, H Li, L Zettlemoyer, V Stoyanov. Emerging Cross-lingual Structure in Pretrained Language Models, Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics, 2020.

M Lewis, Y Liu, N Goyal, M Ghazvininejad, A Mohamed, O Levy, V Stoyanov, L Zettlemoyer. BART: Denoising sequence-to-sequence pre-training for natural language generation, translation, and comprehension, <https://arxiv.org/pdf/1910.13461.pdf>, 2019.

Y Liu, M Ott, N Goyal, J Du, M Joshi, D Chen, O Levy, M Lewis, L Zettlemoyer, V Stoyanov. RoBERTa: A Robustly Optimized BERT Pretraining Approach, <https://arxiv.org/pdf/1907.11692.pdf%5C>, 2019.

Career

Since April 2023, Stoyanov has served as the head of AI/ML at Tome, a productivity company based in San Francisco, where he leads the development of new approaches for AI-powered products. Before joining Tome, he worked for nearly a decade at Facebook and Meta where he most recently served as applied research scientist manager and led the development of pretrained language models such as RoBERTa, XLM-R and OPT. His work at Facebook and Meta broadly related to NLP search, neural machine translation, self-supervised methods for identifying hate speech and multilingual language models. He was also integral to the team who built MultiRay, a service that runs multiple, very large and accurate self-supervised models on the same input. Prior to Facebook, Stoyanov was an assistant research scientist at Johns Hopkins University's Center for Language and Speech Processing where he received a computing innovation fellowship and focused on learning for structured prediction.

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Shady Shehata

Affiliated Associate Professor
of Natural Language Processing

Research interests

Shehata's research interests include: (1) speech-based research including extracting acoustic features for emotion recognition and applying them for check-worthy claims; and (2) text-based research including sentiment analysis for code-switched text data and applies it to propaganda detection. Currently, he is focusing on a multimodal approach using speech and text features to detect and measure hate speech in English and Arabic languages.

Education

- **Ph.D. in machine learning and natural language understanding** from the University of Waterloo, Ontario, Canada.

Publishing

Shehata's research work in the areas of machine learning and artificial intelligence has been recognized and published in top conferences, journals, and patents including IEEE TKDE, Computational Intelligence, Springer KAIS, ACM KDD, IEEE ICDM, IEEE / WIC / ACM WI, Springer ADMA, and SDM.

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Career

Shady Shehata is the Co-founder and CTO of the YOURIKA company. Out of 4000 competing companies worldwide, Shehata built a strong IP technology for personalized learning that allowed YOURIKA to be the first and only Canadian company accepted in the Amazon Alexa Funds Competitive Program based on five due diligence interviews with Amazon AI teams. Amazon invested in YOURIKA and is a partner. Shehata built strong relationships with industry through 70-plus connections at Amazon, Microsoft, and Google.

Before joining MBZUAI, Shehata joined Desire2Learn (D2L), where he spent 10 years leading the research and development of machine learning and data mining algorithms in production.

Shehata led the data science and business intelligence teams at D2L and built a big-data platform to make impactful change in the culture and decision-making processes, enabling descriptive, predictive, and prescriptive analytics.

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Department of
Robotics



Dezheng Song
Professor of Robotics

Research interests

Song's research focuses on robot spatial intelligence, which requires perceiving spatial information from multimodal sensory data and making decisions based upon it. Spatial intelligence is a fundamental ability for robots to perceive their environment and make motion plans to physically interact with it. His research focus includes algorithms for cross-modality perception and learning, robust navigation, scene representation and understanding, and tightly coupled perception and planning. All of the above are built on spatial and motion uncertainty analyses drawn from either explicit geometric/stochastic model-based approaches or data-driven machine learning (ML)-based approaches.

Education

- **Ph.D. in machine learning and natural language understanding** from the University of Waterloo, Ontario, Canada.

Publishing

Gaofeng Li, Shan Xu, Dezhen Song, Fernando Caponetto, Ioannis Sarakoglou, Jingtai Liu, and Nikos Tsagarakis, On Perpendicular Curve-based Task Space Trajectory Tracking Control with Incomplete Orientation Constraint, IEEE Transactions on Automation Science and Engineering (T-ASE), vol. 20, no. 2, April 2023, pp. 1244 - 1261

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Career

Prior to joining MBZUAI, Song was a professor and associate department head for academics in the Department of Computer Science and Engineering at Texas A&M University. From 2008 to 2012, Song was an associate editor of IEEE Transactions on Robotics (T-RO). From 2010 to 2014, he was an associate editor of IEEE Transactions on Automation Science and Engineering (T-ASE). Song was a senior editor for IEEE Robotics and Automation Letters (RA-L) from 2017 to 2021 and currently is a senior editor for IEEE Transactions on Automation Science and Engineering (T-ASE). He is also a multimedia editor and chapter author for Springer Handbook of Robotics. His research has resulted in one monograph and more than 130 refereed conference and journal publications.





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