MIT Industrial Liaison Program Faculty Knowledgebase Report

2018 Systems that Learn Conference in London

February 27, 2018 8:30 am - 4:00 pm

8:30am	Coffee, Registration & Networking

9:10am

Welcome & Introduction
Karl Koster
Executive Director, MIT Corporate Relations
Director, Alliance Management
MIT Office of Strategic Alliances & Technology Transfer

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Karl Koster is the Executive Director of MIT Corporate Relations. MIT Corporate Relations includes the MIT Industrial Liaison Program and MIT Startup Exchange.

In that capacity, Koster and his staff work with the leadership of MIT and senior corporate executives to design and implement strategies for fostering corporate partnerships with the Institute. Koster and his team have also worked to identify and design a number of major international programs for MIT, which have been characterized by the establishment of strong, programmatic linkages among universities, industry, and governments. Most recently these efforts have been extended to engage the surrounding innovation ecosystem, including its vibrant startup and small company community, into MIT's global corporate and university networks.

Koster is also the Director of Alliance Management in the Office of Strategic Alliances and Technology Transfer (OSATT). OSATT was launched in Fall 2019 as part of a plan to reinvent MIT’s research administration infrastructure. OSATT develops agreements that facilitate MIT projects, programs and consortia with industrial, nonprofit, and international sponsors, partners and collaborators.

He is past chairman of the University-Industry Demonstration Partnership (UIDP), an organization that seeks to enhance the value of collaborative partnerships between universities and corporations.

He graduated from Brown University with a BA in geology and economics, and received an MS from MIT Sloan School of Management. Prior to returning to MIT, Koster worked as a management consultant in Europe, Latin America, and the United States on projects for private and public sector organizations.

Simon Hepworth
Director, Enterprise, Imperial College London

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Simon joined Imperial in 2009 with 14 years' corporate experience in the automotive and electronic sectors, having worked for Ford Motor and Visteon. Simon holds a DPhil from the University of Oxford.

Session 1

9:20am

Human-Artificial Intelligence Partnerships

Nick Jennings
Vice-Provost (Research and Enterprise), Imperial College London

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Imperial College London

Professor Nick Jennings CB, FREng is Vice-Provost (Research and Enterprise) at Imperial College. He is responsible for promoting, supporting and facilitating the College's research performance and for leading on the delivery of the Research Strategy. Nick also holds a chair in Artificial Intelligence in the Departments of Computing and Electrical and Electronic Engineering.

In our increasingly connected world, computation is everywhere and we are generating ever more data about everything. These trends will profoundly change the ways in which we work with computers. Specifically, we need the machines to be smarter and more helpful. Central to this vision is the means by which we can forge effective partnerships with such artificial intelligence (AI) systems. Until now, humans have generally been the masters and technology the slave. This needs to change. Today’s AI systems can act on high-level human commands and achieve complex goals in a flexible manner. But, while such systems are good at solving narrowly defined tasks, they don’t know how to collaborate with humans or how to operate as part of a problem-solving team. This talk will explore how humans and AI systems can work together. In such partnerships, the humans and the AI systems complement each other’s strengths and weaknesses, leading to a rise in the humans, as well as in the machines. Drawing on multi-disciplinary work in the areas of AI, autonomous systems, machine learning, crowd sourcing and ubiquitous computing, this talk explores the scientific underpinning of such systems, the applications they have been applied to, and the societal implications of their widespread adoption.

10:00am

Computer Systems Arms Races

Una-May O'Reilly

Principal Research Scientist
Leader, Evolutionary Design and Optimization Group
Director, The Alfa Group: Any Scale Learning for All
MIT Computer Science and Artificial Intelligence Laboratory

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Una-May O'Reilly is a Fellow (elected in 2004) of the International Society of Genetic and Evolutionary Computation, now ACM SIGEVO. She is a recipient of the EvoStar Award for Outstanding Achievements in Evolutionary Computation in Europe. She holds a B.Sc. from the University of Calgary, and a M.C.S. and Ph.D. (1995) from Carleton University, Ottawa, Canada. She joined MIT's Artificial Intelligence Laboratory in 1996.

Currently a principal research scientist at CSAIL, Una-May is founder and co-leader of the AnyScale Learning For All (ALFA) group at CSAIL, MIT (Computer Science and Artificial Intelligence Laboratory). ALFA focuses on scalable machine learning, evolutionary algorithms, and frameworks for large scale knowledge mining, prediction and analytics. The group has projects in clinical medicine knowledge discovery, wind energy and MOOC technology.

Una-May serves as Vice-Chair of ACM SIGEVO. She served as chair of the largest international Evolutionary Computation Conference, GECCO, in 2005. She has served on the GECCO business committee, co-led the 2006 and 2009 Genetic Programming: Theory to Practice Workshops and co-chaired EuroGP, the largest conference devoted to Genetic Programming. In 2013 she inaugurated the Women in Evolutionary Computation group at GECCO.

Una-May is the area editor for Data Analytics and Knowledge Discovery for Genetic Programming and Evolvable Machines (Kluwer), and editor for Evolutionary Computation (MIT Press), and action editor for the Journal of Machine Learning Research.

Una-May holds multiple patents (some pending): One is for a genetic algorithm technique applicable to internet-based name suggestions. It was brought to practice in Nymbler.com. Another, brought to practice in the DELPHI system, is for a dataset-size invariant approach to accelerating machine learning model search. A third is for a copula-based wind energy assessment method that supports advanced software for analyzing, valuing, and financing renewable energy projects. Two others, associated with the STEALTH project, relate to taxable income measurement and extraction, as well as the assessment of tax audit likelihood. The methods can identify effective, economically-valid strategies that simultaneously reduce or minimize tax liability and the likelihood of being audited. Reciprocally, they can identify effective tax auditing policies to help facilitate the efficient allocation of limited auditing resources.

Dr. O'Reilly holds advisory roles with Evervest, Aspiring Minds, PatternEx and is a co-founder of ProvidentiaTax.

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High stakes arms races abound in computer and cyber systems. As we take ML-based security measures to counter malware, network attacks, intrusion or reconnaissance, the perpetrators develop and exploit unanticipated variations that get the better of them. My research agenda is to approach this problem by using machine learning techniques. My ultimate goal is more robust measures supported by an understanding of arms race dynamics. I will discuss my group's work on DDOS attacks on resilient peer to peer networks, deception vs insider reconnaissance, malware detector vs malware evasion and macro-scale network security conflict modeling.

10:40am

Industry Keynote: Creating Value for BT's Customers with AI
Colin Bannon
Chief Technology Officer and Director of Design, BT Global Services

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BT Global Services

Colin was appointed as the Regional Chair for the West Midlands in July 2015. Alongside his Regional Chair role, Colin is chief technology officer for BT Wholesale, heading up the team responsible for helping to shape BT's strategy and predict technology trends and future use. In April 2015, Colin was named as one of the 50 CTOs to watch by Global Telecoms magazine. This recognition highlights Colin's expertise in designing, deploying and running next generation networks, as well as his background in strategy, architecture, professional services and technology. Although based in the West Midlands, Colin's work involves regular trips to BT's research hub at Adastral Park, in Suffolk.

Colin, who is from Leamington Spa and based in Birmingham, has worked for BT for more than 10 years and brings with him a wealth of experience. Colin's wife, Emma, also works for BT, and they have a six-year-old son. Colin is the vice chairman of the Old Leamingtonians Rugby Club and is a volunteer for Action for Children and Barefoot Computing, an initiative to improve computer and IT literacy in schools.

BT has always been committed to employing the latest technologies to deliver empower its customers and its people, and partners globally to bring that technology to life. For many years we have used mature AI techniques to underpin our services and operations but emerging technologies are presenting dramatic new possibilities. In this talk I'll outline some of the challenges and opportunities we face, discuss our latest research and outline the key future challenges and opportunities that BT is excited to explore with our partners.

11:20am

Networking Break

Session 2

11:40am

Startup Lightning Talks
John Andrews
CEO, Celect

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CEO
Celect

John has spent the last two decades helping retailers, distributors, and brands optimize their omni-channel strategies and operations. Prior to Celect, John was VP of Product Management & Strategy for Oracle Commerce, coming to Oracle via the Endeca acquisition where John was VP of Marketing & Product Management. John started his career within Deloitte Consulting's Strategy & Operations practice. John holds a BA in Economics and Computer Science from Boston College and received his master's degree from the Harvard Business School.

About Celect
Celect is a cloud-based, predictive analytics SaaS platform that helps retailers optimize their overall inventory portfolios in stores and across the supply chain, resulting in double-digit percentage revenue increases. This groundbreaking advance in machine learning and optimization allows retailers to understand how an individual customer shopping in store or online chooses from an assortment of products, revealing true demand. The technology builds on a fundamental advance in customer choice modeling called by MIT's Computer Science and Artificial Intelligence Laboratory one of the 50 greatest innovations it has ever produced.

Arlene Ducao
CEO, Multimer

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Arlene Ducao is a graduate of MIT Media Lab and the CEO of Multimer, a location analytics system that supports human-centered spatial design and decisions. It does this by collecting, visualizing, and analyzing geolocated, indoor and outdoor biosensor data transmitted by common wearables, including smartwatches, heart rate straps, and brainwave bands. By collecting and analyzing biosensor data through Multimer, organizations can more deeply understand how their users, employees, and customers truly experience a space.

Tor Jakob Ramsøy
Founder & CEO, Arundo

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Arundo Founder and CEO Tor Jakob Ramsøy was previously a Senior Partner at McKinsey & Company, the global management consulting firm. At McKinsey, he led the technology service lines for the Global Energy Practice and EMEA Big Data/Advanced Analytics, and was also country manager for McKinsey Norway and led the Business Technology Office in Scandinavia. Prior to McKinsey, Ramsøy was a Senior Partner at Accenture. He holds an MS from MIT.

Arundo is a software company based in Oslo, Norway; Houston, TX; and Palo Alto, CA

12:30pm Lunch with Interactive Startup Exhibition

Session 3

2:00pm The Human Strategy
Alex Pentland
Toshiba Professor
Professor of Media Arts and Sciences
Head, Human Dynamics Research Group

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Alex "Sandy" Pentland directs MIT's Connection Science initiative and the MIT Media Lab Entrepreneurship Program and is a founding member of advisory boards for the World Economic Forum, AT&T, Telefonica, United Nations, and Nissan. He previously helped create and direct MIT's Media Laboratory, the Media Lab Asia laboratories at the Indian Institutes of Technology, and Strong Hospital's Center for Future Health.

Forbes magazine declared Pentland "one of the seven most powerful data scientists in the world," along with the founders of Google and the CTO of the United States. Pentland is among the most-cited computational scientists in the world, and a pioneer in big data analytics, computational social science, organizational engineering, and wearable computing. His research has been featured in *Nature*, *Science*, the World Economic Forum, and *Harvard Business Review*, as well as being the focus of TV features including "Nova" and "Scientific American Frontiers." His most recent books are *Social Physics*, and *Trust :: Data*.

Interesting experiences include winning the DARPA 40th Anniversary of the Internet Grand Challenge, dining with British Royalty and the President of India, staging fashion shows in Paris, Tokyo, and New York, and developing a method for counting beavers from space.

View full bio

Our future will have big data, AIs, and cyberwarfare, so how can we build a world that still has a human feel to it and is a comfortable place to live? The fact that everything is becoming “datafied” together with the emergence of new, more powerful machine learning techniques means that we can now build human-AI ecologies in ways we could never do before. I will describe how we are beginning to use these new tools to design a better framework for human and AI to work together, and how we are beginning to test this framework at scale on four continent with the support of major countries, multilateral agencies, and multinational corporations.

2:40pm

The Atlas of Behaviour
Aldo Faisal
Senior Lecturer in Neurotechnology, Imperial College London

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Senior Lecturer in Neurotechnology
Imperial College London

Dr Faisal is an Associate Professor in Neurotechnology jointly at the Dept. of Bioengineering and the Dept. of Computing at Imperial College London. He is also Associate Group Head at the MRC Clinical Sciences Center (Hammersmith Hospital) and is affiliated faculty at the Gatsby Computational Neuroscience Unit (University College London).

Our aim is to gain a data-driven understanding of human behaviour and develop human-in-the loop machine learning that helps people in health and disease. Our work is applied to Human Neurotechnology and combines cross-disciplinary machine learning and robotics approaches together with neuroscience to reverse engineer the human perception-action loop in health and disease. To this end my lab is pursuing four research strands:

1. Build an Atlas of Behaviour using wearable sensors to capture as much human perceptual input and motor output as possible in daily life (wearable technology)
2. Understand human behaviour to predict intention and computational human neuroscience
3. Engineer human-robot interfaces that restore motor function in the paralysed (human augmentation)
4. Translate our algorithms and devices in application with end-users, such as Muscular Dystrophy, Stroke, Multiple Sclerosis and Spinal Cord Injury survivors with the intention to take our research all the way from algorithm to the bedside (translational engineering)

3:20pm

Industry Keynote: How AI Can Bring Us Closer to Our Customers
Josh Bottomley
Global Head of Digital, HSBC

Josh Bottomley
Global Head of Digital
HSBC

Josh Bottomley is Global Head of Digital for HSBC. He and his team are responsible for driving innovation, new digital ways of working and the design, development, deployment and commercialisation of digital platforms and products within HSBC Retail Banking and Wealth Management.

Prior to HSBC, Josh was Global Head of Display for Google in California, where he was responsible for driving growth in Google's largest non-search business.

Before this he spent 12 years in general management roles in publishing, data and business services, including LexisNexis and the Financial Times. His early career was at Goldman Sachs and McKinsey.

The way people bank has changed but the need to manage their money now and in the future hasn't. Artificial intelligence has many different uses and in financial services the opportunities are significant, not only for operational improvements, but also to create personal and relevant experiences which help customers make better financial decisions.

4:00pm	Adjournment with Networking Reception