

New Faculty

Our newest faculty members join the Division of Engineering and Applied Science in 2014.

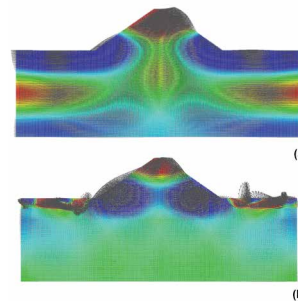
Domniki Asimaki

Professor of Mechanical and Civil Engineering



Domniki Asimaki's research combines geotechnical engineering, computational mechanics, and structural dynamics to study how natural and man-made geotechnical systems (ridges, valleys, dams, tunnels, building foundations, and offshore structures) respond to dynamic loading induced, for example, by earthquakes, hurricanes, and blast. She then uses results from these studies to develop predictive models for resilient design procedures for geotechnical systems, and for hazard assessment and mitigation in urban environments.

Domniki Asimaki has a BS in civil engineering from the National Technical University of Athens, Greece (1998), and an MS (2000) and PhD (2004) from MIT. She has worked as a researcher for the European Research Program Safety Assessment for Earthquake Risk Reduction (SAFERR) at Géodynamique et Structure in Paris, France (2001), and as a postdoctoral researcher at the Institute for Crustal Studies at the University of California, Santa Barbara (2004–2005). Prior to joining the EAS faculty at Caltech, she was on the faculty of the School of Civil and Environmental Engineering at Georgia Tech (2005–2014). Dr. Asimaki is associate editor for the *Journal of Computing in Civil Engineering* (ASCE), for *Earthquake Spectra* (EERI), and for *Soils and Foundations* of the Japanese Geotechnical Society. She is the principal author and co-author of more than 50 publications in the areas of geotechnical engineering, strong motion seismology, engineering mechanics, and geophysics, and the recipient of the 2009 Arthur Casagrande Award from the ASCE Geo-Institute and the 2012 Shamsheer Prakash Research Award in Geotechnical Earthquake Engineering.



This simulation shows how a soft soil layer can affect the seismic shaking near convex topographies, a problem with implications for seismic hazard assessment in mountainous regions as well as in the design of dams.

Joanna Austin

Professor of Aerospace



Joanna Austin's research is focused on fundamental problems in reactive, compressible flows across a broad range of applications, including hypervelocity flight and planetary entry, supersonic combustion and detonation, bubble dynamics, and explosive geological events. She joins EAS's Department of Aerospace from the University of Illinois at Urbana-Champaign, where she was an associate professor and Willett Faculty Scholar. Austin received a BE (mechanical and space engineering) and BSc (mathematics) from the University of Queensland, Australia, and an MS (1998) and PhD (2003) from GALCIT at Caltech. As a faculty member in the Aerospace Engineering Department at Illinois, she established the Compressible Fluid Mechanics Laboratory and built the hypervelocity expansion tube. Her honors and awards include becoming an AIAA Associate Fellow in 2011 as well as receiving the Xerox Award for Faculty Research in 2011, the NSF CAREER Award in 2010, the AIAA Best Paper Award in 2009, and the AFOSR Young Investigator Award in 2007.

Katherine Faber

Simon Ramo Professor of Materials Science



Katherine Faber is interested in the fracture of brittle materials and the mechanisms by which such materials can be toughened and strengthened through composite strategies and residual stresses, often using synchrotron radiation for internal stress measurement. Her studies comprise ceramics for energy-related applications, including thermal and environmental barrier coatings for power generation components and porous solids for filters and flow. More recently, she has worked with the Art Institute of Chicago to establish the Northwestern University–Art Institute of Chicago Center for Scientific Studies in the Arts, where advanced materials characterization and analytical techniques are used in support of conservation science.

After receiving a BS in ceramic engineering, she earned an MS in ceramic science at the Pennsylvania State University and a PhD in materials science and engineering from the University of California, Berkeley. Prior to joining the Caltech faculty, she held appointments at the Ohio State University and Northwestern University. Among Professor Faber's awards are the National Science Foundation's Presidential Young Investigator Award, selection as Distinguished Life Member of the American Ceramic Society and Fellow of ASM International, the Charles E. MacQuigg Award for Outstanding Teaching at Ohio State, the Society of Women Engineers Distinguished Educator Award, and the YWCA Achievement Award for Education. She is an ISI Highly Cited Researcher in Materials (2003), served as president of the American Ceramic Society (2006–07), and was elected to the 2014 American Academy of Arts and Sciences class of fellows.

Victoria Kostina

Assistant Professor of Electrical Engineering



Victoria Kostina's research spans information theory, coding, and wireless communications. Her current efforts explore one of the most exciting avenues in today's information theory: the nonasymptotic regime. Leveraging tools from the theory of random processes and concentration of measure, she pursues fundamental insight into modern delay-constrained communication systems.

She holds a bachelor's degree from Moscow Institute of Physics and Technology (2004), where she was affiliated with the Institute for Information Transmission Problems of the Russian Academy of Sciences. She was granted the Natural Sciences and Engineering Research Council of Canada postgraduate scholarship in 2005 and obtained a master's degree from the University of Ottawa in 2006. She completed her PhD at Princeton University in 2013, where she received the Electrical Engineering Department's Best Dissertation Award for her thesis on information-theoretic limits of lossy data compression.



Thomas Vidick

Assistant Professor of Computing and Mathematical Sciences



Thomas Vidick's research is situated at the interface of theoretical computer science, quantum information, and cryptography. He is interested in using complexity theory as a lens to approach fundamental problems in quantum computing. He has investigated the role of entanglement in multi-prover interactive proof systems and obtained the first substantial computational hardness results on the power of entangled provers. He has made important contributions to the field of device-independent cryptography, where the property of entanglement monogamy plays a key role. His work also demonstrates that insights from quantum information theory can be productively transferred to yield novel perspectives on fundamental techniques in theoretical computer science such as semidefinite programming and approximation algorithms.

Vidick received a bachelor's degree in pure mathematics from École Normale Supérieure in Paris, a master's in computer science from Université Paris 7, and a PhD in computer science from UC Berkeley. His PhD thesis was awarded the Bernard Friedman Memorial Prize in Applied Mathematics. Before joining Caltech, he was a postdoctoral associate in CSAIL at the Massachusetts Institute of Technology. He has held visiting positions at the Centre for Quantum Technologies in Singapore, the Perimeter Institute in Waterloo, and the Simons Institute for the Theory of Computing at Berkeley. His paper "A multi-prover interactive proof for NEXP sound against entangled provers," co-authored with Tsuyoshi Ito, was co-awarded the best paper award at the FOCS 2012 symposium.

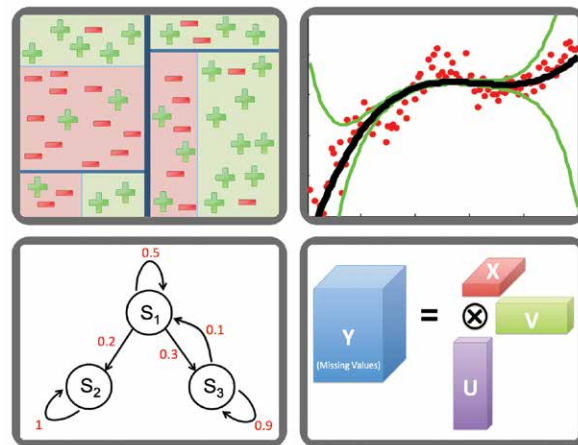
Yisong Yue

Assistant Professor of Computing and Mathematical Sciences



Yisong Yue's research interests lie primarily in the theory and application of statistical machine learning. He is particularly interested in developing novel methods for structured prediction, spatiotemporal reasoning, adaptive learning systems, and learning with humans in the loop. In the past, his research has been applied to information retrieval, content recommendation, text classification, learning from rich user interfaces, analyzing implicit human feedback, data-driven animation, sports analytics, policy learning in robotics, and adaptive routing and allocation problems.

Dr. Yue received his BS in computer science from the University of Illinois at Urbana-Champaign (2005) and his PhD in computer science from Cornell University (2010). During his PhD, Dr. Yue spent time visiting Microsoft Research and Google, where he worked on machine learning approaches to training and analyzing search engines. Dr. Yue was then a postdoctoral researcher in the Machine Learning Department at Carnegie Mellon University (2010–2013), where he worked on interactive personalization of recommender systems and adaptive routing and allocation of large fleets of vehicles in urban environments. He was also a research scientist at Disney Research (2013–2014), where he worked on data-driven visual speech animation and modeling player behavior in sports. He is the recipient of a Microsoft Research graduate fellowship (2008).



Moore Scholar

The Moore Distinguished Scholars program was established by Gordon and Betty Moore to invite researchers of exceptional quality who are distinguished at both the national and international levels to visit the California Institute of Technology for three to six months. There are no teaching or other obligations during the appointment, allowing Moore Scholars to focus on research.

Robert Braun

David and Andrew Lewis Professor of Space Technology, Georgia Institute of Technology



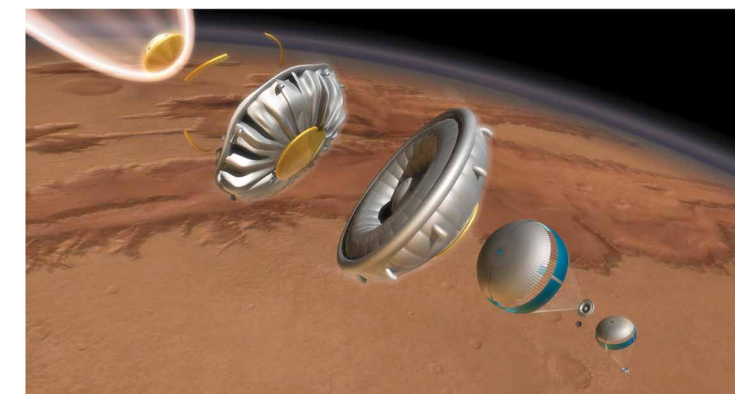
Robert Braun's research interests center on the design of advanced flight systems and technologies for planetary exploration. His research integrates aspects of conceptual design and analysis, optimization theory, technology development, modeling and simulation, and experimental validation. Through these efforts, he has advanced the state of the art of entry, descent, and landing technology and contributed to the design, development, test, and operation of both robotic and human space-flight systems. He has also been active in the development of theory and methods for multidisciplinary design, systems engineering, and optimization.

He joined the Georgia Institute of Technology faculty in 2003. Prior to this, he served on the technical staff of the NASA Langley Research Center. He has also served as a senior leader for several large engineering organizations at NASA. In 2010–2011, he served as the first NASA Chief Technologist in more than a decade. In this capacity, he was the senior agency executive for technology and innovation policies and programs and created the NASA Space Technology programs. In 2012, Dr. Braun co-founded Terminal Velocity Aerospace, LLC, a small business focused on developing a suite of reentry devices to improve orbital debris hazard prediction and promote space utilization.

He received a BS in aerospace engineering from Penn State in 1987, an MS in astronautics from the George Washington University in 1989, and a PhD in aeronautics and astronautics from Stanford University in 1996. He is a member of the National Academy of Engineering, an AIAA Fellow, and the principal author or co-author of over 275 technical publications in the fields of atmospheric flight dynamics, planetary exploration, multidisciplinary design optimization, and systems engineering. He lives on a small farm in Newnan, Georgia, with his wife, Karen, and is the proud father of Zack, Allie, and Jessica Braun.



In this visualization, a reentry black box data recorder survives destruction of its host spacecraft during atmospheric breakup, improving orbital debris hazard prediction and reentry safety knowledge.



A supersonic inflatable aerodynamic decelerator enables delivery of significantly more mass to the Mars surface.