THE FUTURE OF SIAM

When the ’S’ in SIAM Stands for Students
Improving STEM education around the world and encouraging students in the United States and beyond to pursue industrial and applied mathematics.

siam® Society for Industrial and Applied Mathematics

Current Student SIAM Chapters

IRENE FONSECA

SIAM President, 2013-2014

As a truly international society for industrial and applied mathematics and computer science, SIAM continues to actively nurture students outside the United States as well, primarily through its growing network of student chapters

With demand for STEM jobs (and STEM competencies more generally) growing faster in the last few decades than the overall job market, SIAM plays and will continue to play a key role in meeting that demand.

A Second Doubling for SIAM's Student Travel Fund

In 2011, under the leadership of my predecessor, then-SIAM president Nick Trefethen, the SIAM Board of Trustees decided to allocate $100,000 each year to the Student Travel Fund.

Most notably, at its July 2013 meeting, the Board elected to double the annual investment, to $200,000, starting in 2014. As of January 2014, SIAM will make approximately $250,000–$275,000 available each year for Student Travel Awards.

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SIAM NEWS BLOG

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Founding a New SIAM Student Chapter at TU Delft

By Manuel Baumann

I was offered the opportunity to share some (personal) experiences about our Delft University of Technology Chapter of SIAM, which was founded in fall 2014. The story of our student chapter begins slightly earlier with so-called baNaNa talks - a series of informal lectures *for and by* PhD students in the Department of Numerical Analysis. The talks cover software tools and practical aspects from the life of the (young) mathematical researcher. Based on this framework, a small group of active PhD students founded the student Chapter in Delft – the first one in the Netherlands. Throughout the whole process, the chapter received great support from faculty advisors at TU Delft as well as from SIAM. For our kick-off meeting, former SIAM president Irene Fonseca sent us this video message.

Seven Decades of Mathematics and Mechanics

By Maria-Carme Calderer and Richard D. James

On the occasion of Jerald LaVerne Ericksen's 90th birthday, a group of mathematicians and scientists came together in Eugene, Oregon, last October to celebrate accomplishments in the field of mathematics and mechanics. The workshop, entitled "Mathematics and Mechanics in the 22nd Century: Seven Decades and Counting," spanned the seven decades of Ericksen's research career and offered a view of future research prospects.[1]

In the late 1940s, researchers recognized both th inadequacy in existing theory of the description c complex materials and the need for new mathematical concepts and tools. This led to the emergence of modern applied mathematics, in w new concepts in geometry, analysis, partial differential equations, and numerical, computatic and stochastic mathematics develop synergistica with molecular and continuum mechanics. The concurrent rise of the fields of materials science polymer chemistry also contributed to this syner

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KSIAM Celebrates 10th Anniversary

The Korean Society for Industrial and Applied Mathematics held its 10th-anniversary conference on the tropical Jeju Island, November 20–22, 2014. The conference was jointly organized by KSIAM and the A3 Foresight Programs (a Chinese/Japanese/Korean research consortium). Among the approximately 300 participants were 75 Chinese and Japanese scholars from the A3 meeting.

SIAM president Irene Fonseca, one of three plenary speakers—-with Zhiming Chen (Chinese Academy of Sciences) and Haesun Park (Georgia Institute of Technology)—-also participated in a panel discussion, "Vision and Global Challenges for 2024 KSIAM." Min-Jae Tahk of Korea Advanced Institute of Science and Technology, recipient of the annual KSIAM–Kumkok Award, gave a lecture, and Chang-Ock Lee, also of KAIST, gave a public lecture.

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Traditions and Transitions for SIAM in 2015

Making the transition from high-profile publishing positions within SIAM, Pam Cook (second from left) begins a two-year term as SIAM president on January 1. She succeeds Irene Fonseca (second from right), some of whose world travels on behalf of SIAM are documented in this and previous issues of SIAM News. Cook and Fonseca are shown here with predecessors, from left, Gil Strang (1999–2000), Doug Arnold (2009–10), and Nick Trefethen (2011–12). Photo by David Sytsma, Corporate Chicago Photography.

New years are always times of transition. This year, Pam Cook becomes president of SIAM on January 1, and Irene Fonseca transitions to the position of past president, which she'll occupy for one year. By the end of 2015, we will have elected the next president of SIAM, and that person will become president-elect, starting the cycle once again.

Irene Fonseca has been an energetic president, representing SIAM around the globe and encouraging the development of SIAM student chapters at many universities. She has also taken a keen interest in serving our industrial members, and many of her initiatives in that area will continue to be developed over the coming years.

NSF Sunsets Funding for IMA and MBI

By Pamela Cook and Irene Fonseca

Many of you have shared your concerns that NSF will be sunsetting funding for the Institute for Math and its Applications (IMA) and the Math Biology Institute (MBI, potentially to be continued through joint funding with the Biological Sciences Directorate). As current and immediate past presidents of SIAM, we share your concern. The Division of Mathematical Sciences has faced a difficult budget period and made decisions on these institutes after a thorough review process. Other institutes under review—including MSRI, IPAM, and ICERM—appear to have been recommended for renewal. NSF cannot share additional information until the review process has been completed, but we hope that NSF will eventually provide information on their vision for the institutes and clear policies concerning their longevity and metrics for success. We also recognize the strong role IMA and MBI play in anchoring applied mathematics in the midwest and connecting the community to industry, and hope that NSF will think thoughtfully about how to maintain these functions even as funding for these institutes is ended. We look forward to hearing from NSF regarding future support of the applied math community in light of these divestments.

Please feel free to share your thoughts and feedback through the comments section below.

Pam Cook is Unidel Professor of Mathematics, Associate Dean of Engineering, and professor of chemical engineering at the University of Delaware. She is the current president of SIAM.

Irene Fonseca is a past president of SIAM and the Mellon College of Science University Professor of Mathematics, and director of the Center for Nonlinear Analysis at Carnegie Mellon University.

International Agenda for KAUST's UQ Center

By Raul Tempone

The two-year-old Center for Uncertainty Quantification at the King Abdullah University of Science and Technology exemplifies the connections forged by KAUST with universities, professional societies, and industry worldwide. KAUST established the center in mid-2012, following a worldwide competition for Strategic Research Initiatives.

SRI-UQ and SIAM. Clockwise from front left: Ben Mansour Dia, Alvaro Moraes, Pedro Vilanova, Hamidou Tembine, Hakon Hoel, SRI-UQ director Raul Tempone, SIAM president Irene Fonseca, Kody Law, and Bilal Saad.

In its short existence, SRI-UQ has held two international workshops and hosted more than 40 world-class scientific visitors. SRI-UQ is actively mentoring a thriving cohort of graduate students and postdoctoral fellows, and several new UQ-related graduate courses have been created. As part of its mission, SRI-UQ also interacts with industry not only in Saudi Arabia and the region, but throughout the world.

UQ methods are essential to an understanding of complex systems, in which varying levels of uncertainty in different components can affect system behavior. Researchers in the area seek to quantify and eventually reduce the impact of those uncertainties in decision-making, risk assessment, and forecasting. As a consequence, UQ is particularly well suited to

The SIAM Board and Council at Work

By James Crowley

Richard James, one of two recipients of the 2014 Theodore von Karman Prize, accepted the prize certificate from SIAM president Irene Fonseca.

Become a SIAM Ambassador

Will you be traveling in the future? Consider sharing SIAM with your colleagues. SIAM President Irene Fonseca asked us to create a place where she could easily download SIAM material to take with her as she travels around the world visiting applied mathematicians and computational scientists. So, we created a new webpage for SIAM Ambassadors. If you want to talk about SIAM in your travels, everything you'll need is there.

"The SIAM Ambassador program is an important part of our mission to raise the visibility of the math profession, and an easy way for our members to spread the word about all the wonderful perks of joining SIAM, both among their colleagues and when traveling." — Irene Fonseca, SIAM President, Carnegie Mellon University

Behind the Scenes of ICIAM

By Gail Corbett

Near the beginning of her two-year term as SIAM president (2013–14), Irene Fonseca identified two top priorities: internationalization and industry. These are precisely at the two poles of ICIAM ("which has two I's"), she says. For SIAM ("which has only one I, but I double it!"), "being part of ICIAM is fundamental to building bridges to the rest of the world." Few would agree more with the value of such bridges than Barbara Keyfitz and Maria Esteban, president and president-elect, respectively, of ICIAM.

Fonseca, Keyfitz, and Esteban were among the distinguished visitors from around the world who gathered at the Mathematical Biosciences Institute at Ohio State University, May 15 and 16, to attend the annual board meeting of the International Council for Industrial and Applied Mathematics. At the request of *SIAM News*, Keyfitz (a professor of mathematics at OSU), made arrangements for a taped lunchtime conversation among the three during the workshop that preceded the meeting.

When the 'S' in SIAM Stands for Students

By Irene Fonseca

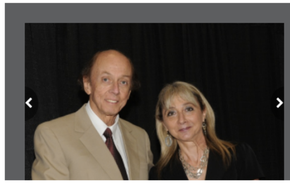
SIAM's year-round efforts involve lobbying governments for greater research funding for our members and organizing conferences to foster stronger ties between academia and industry, but behind it all is a part of our mission just as vital: cultivating the next generation of scientific and industrial researchers. This is why SIAM constantly advocates for better STEM (Science, Technology, Engineering, and Mathematics) education, continues to expand its student chapter network, and just increased the amount of funding available to send students to SIAM conferences worldwide.

Improving STEM education is a priority for countries around the world, but nowhere is it more pressing than in the United States, where a considerably lower proportion of college students go into STEM fields. Back in 2012, the President's Council of Advisors on Science and Technology (PCAST) published a report calling for one million additional college graduates with STEM degrees. Fewer than 40 percent of students who enter college planning to major in a STEM field actually finish such a degree, the authors found. The report served as a "wake-up call" for the STEM teaching community, American Mathematical Society Past President Eric Friedlander wrote at the time, encouraging SIAM and several other professional societies to jointly confront the challenge set forth in the PCAST report.

This past July, SIAM as well as the Mathematical Association of America (MAA), the American Statistical Association (ASA), and the American Mathematical Society (AMS) — with funding from the National Science Foundation (NSF) — held a 3-day conference as part of the INGenIOuS Project, which stands for "INvesting in the next Generation through Innovative and Outstanding Strategies." This collaboration seeks to identify and encourage the adoption of effective practices to improve student recruitment, retention, degree completion, and job placement so as to keep the pipeline of professional mathematicians and statisticians pumping smoothly. Many of these practices — certainly applicable to other countries looking to revamp STEM education — are outlined in a series of white papers available on the INGenIOuS website, covering everything from "Technologies and MOOCs" to "Internships."

2013 SIAM Annual Meeting & Conference on Control and its Applications

Bruce Hendrickson and Hinke Osinga, co-chairs of the organizing committee for the 2013 SIAM Annual Meeting (San Diego, July 8–12), set out to create a program that would reflect as closely as possible the themes of Mathematics of Planet Earth 2013. They quickly realized that just about everything the SIAM community does falls in some sense under MPE. From the opening talk, by Lada Adamic on the ways in which information is shared (and transformed), through John Burns's plenary talk (joint with the control conference) on energy-efficient whole-building systems, to the sessions on the final day, speakers touched on issues and problems facing everyone on the planet. Hendrickson and Osinga also sought to keep the meeting vibrant right up to the end. They are shown in the accompanying image gallery with several of the people who helped them meet both goals: Benjamin Santer, who titled his invited talk "The Search for a Human Fingerprint in the Changing Thermal Structure of the Atmosphere"; Chandrika Kamath and John Zack, co-organizers of a minisymposium on forecasting wind and solar power production (also the subject of Zack's invited talk); and Mary Silber, organizer and speaker in a session on tipping points.



Irene Fonseca presents the 2013 W.T. and Idalia Reid Prize to Tyrone Duncan, a control theorist. Duncan was honored for his "fundamental contributions to nonlinear filtering, stochastic control, and the relation between probability and geometry."

A Second Doubling for SIAM's Student Travel Fund

From the SIAM President

By Irene Fonseca

Joscha Gedicke of Humboldt University of Berlin accepted a 2013 SIAM Student Paper Prize from Irene Fonseca. The two other recipients were Keiichi Morikuni of the Graduate University of Advanced Studies (Sokendai), Japan, and Vladislav Voroninski of the University of California, Berkeley; all three

Each year, SIAM awards grants to hundreds of students for travel to SIAM conferences around the world, as part of its ongoing commitment to cultivating and training a new generation of mathematical scientists.

When it was launched several years ago, the Student Travel Fund relied primarily on National Science Foundation grants and donations of royalties by generous SIAM book authors. From there, it grew to include donations from the general SIAM membership (via a checkbox on the membership renewal form).

In 2011, under the leadership of my predecessor, then-SIAM president Nick Trefethen, the SIAM Board of Trustees decided to allocate $100,000 each year

AMBASSADOR PROGRAM

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SIAM CHAPTERS

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North America
127

Europe
26

Asia
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South America
5

Africa
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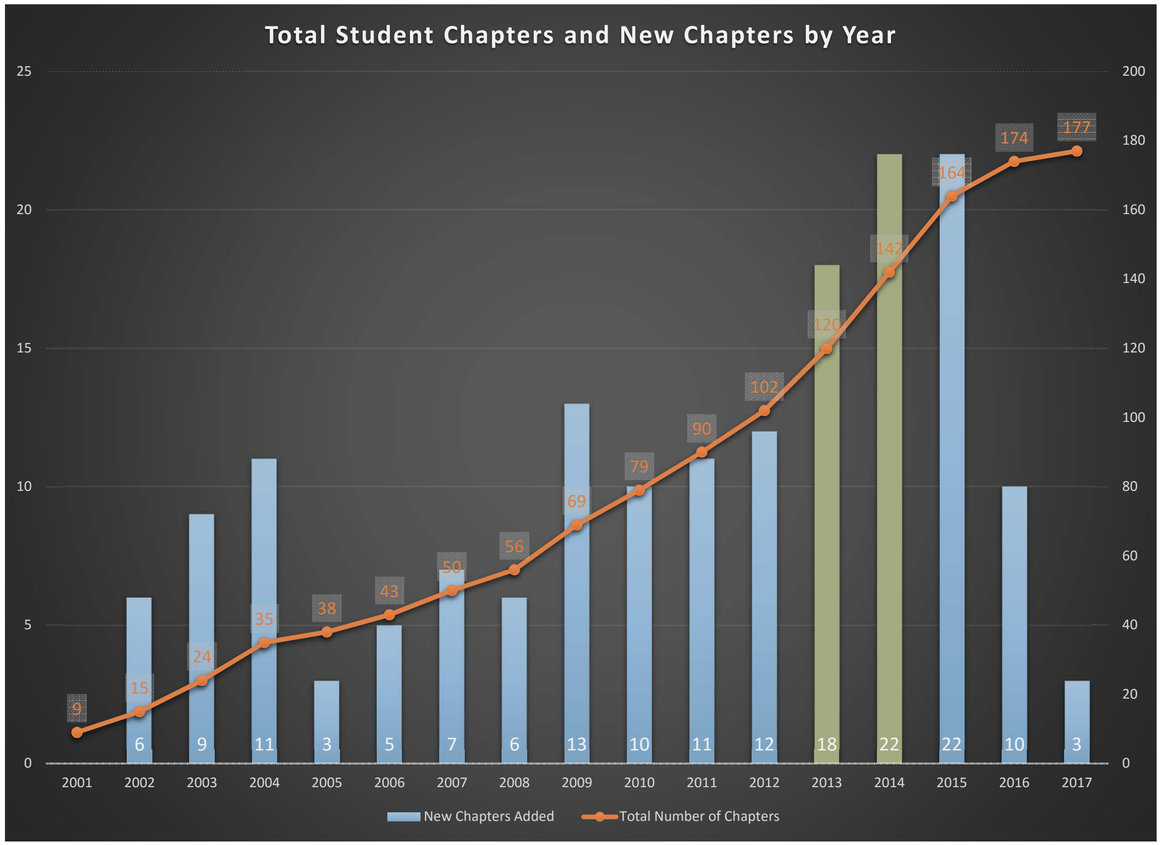
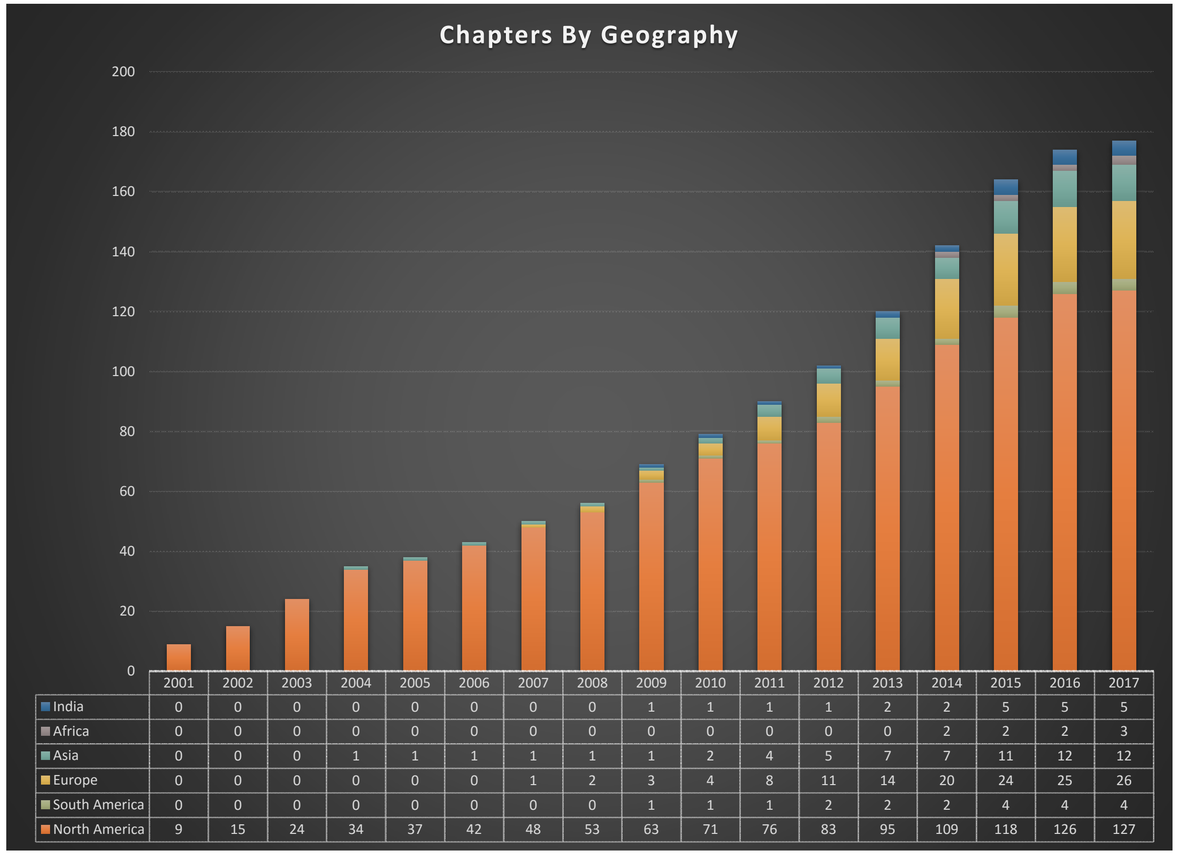
GROWTH TRENDS





	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
India	0	0	0	0	0	0	0	0	1	1	1	1	2	2	5	5	5
Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	3
Asia	0	0	0	1	1	1	1	1	1	2	4	5	7	7	11	12	12
Europe	0	0	0	0	0	0	1	2	3	4	8	11	14	20	24	25	26
South America	0	0	0	0	0	0	0	0	1	1	1	2	2	2	4	4	4
North America	9	15	24	34	37	42	48	53	63	71	76	83	95	109	118	126	127

From 9 to 179 chapters in 16 years

From 1 to 24 countries in 16 years

CANADA

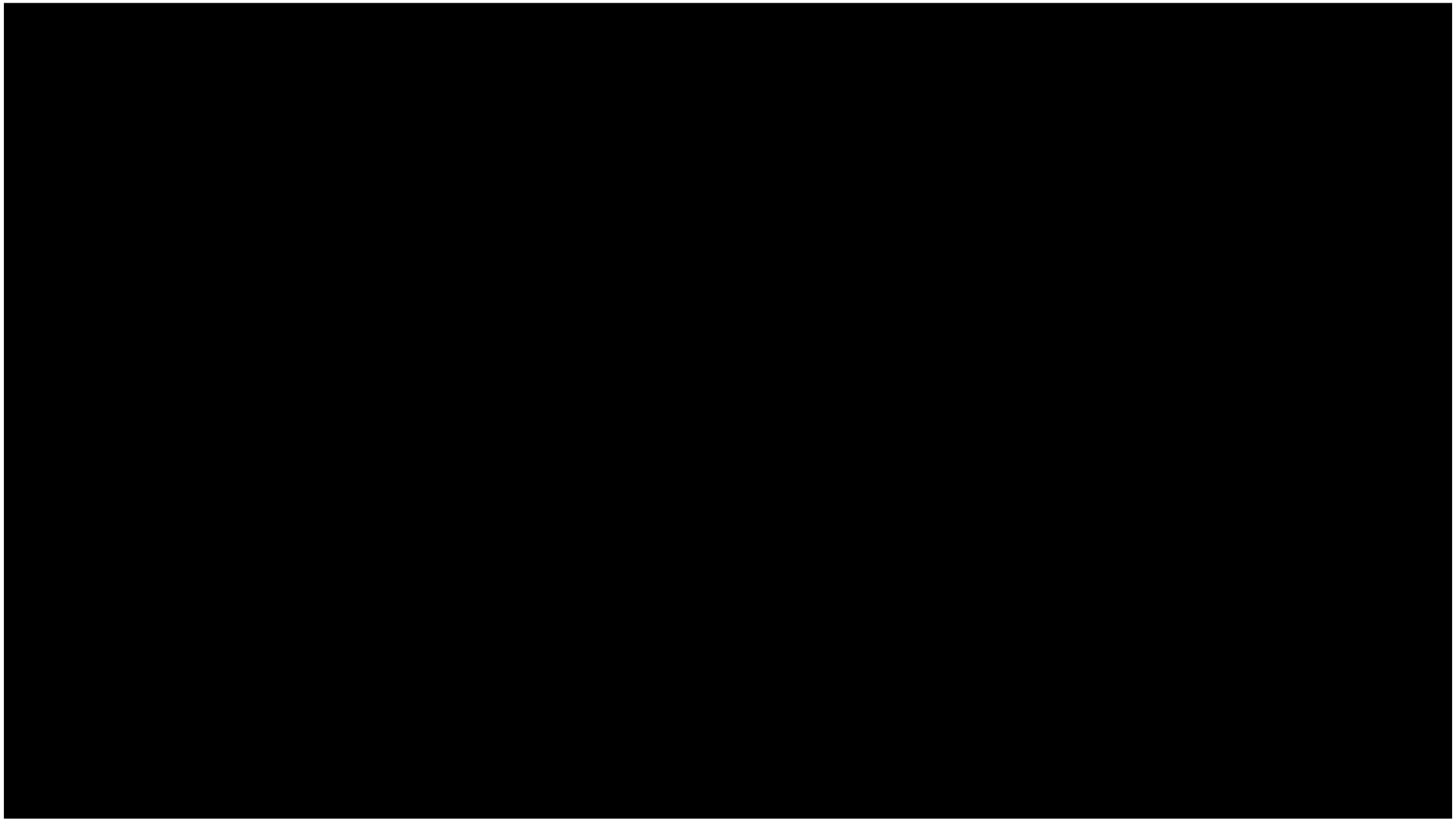
McMaster University, Hamilton

CHILE

Universidad Tecnica Federico Santa Maria, Valparaiso

CHINA

Chinese Academy of Sciences, Beijing



CZECH REPUBLIC

Charles University, Prague

INDIA

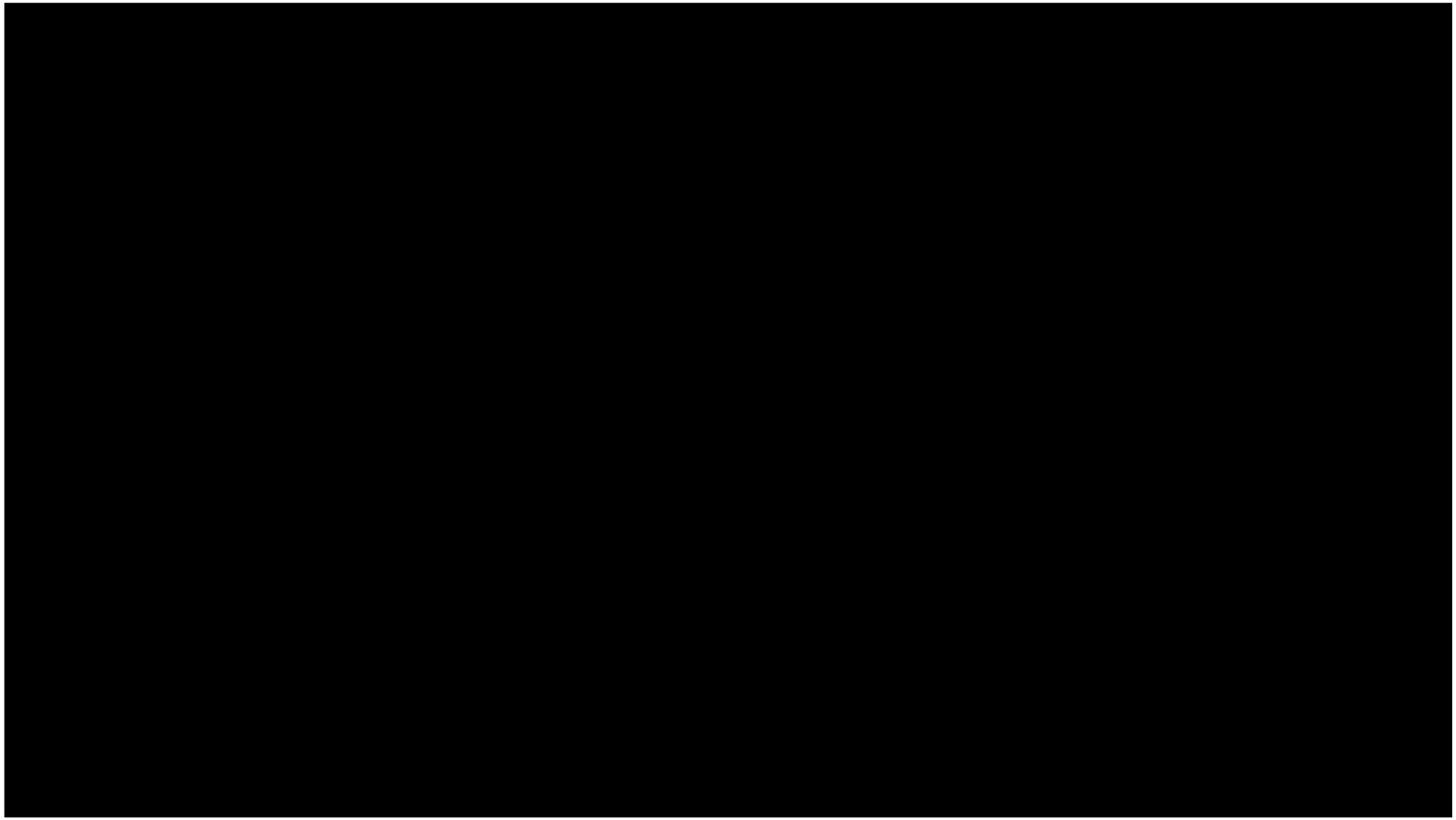
Indian Institute of Sciences, Bangalore

IRELAND

National University of Ireland, Galway

SAUDI ARABIA

King Abdullah University of Science & Technology (KAUST)



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Carnegie Mellon University, Pittsburgh


2012年中華民國數學會年會

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10th ANNIVERSARY
한국산업응용수학회 10주년 기념 가을학술대회
KSIAM 2014 Annual Meeting
November 20 - 23, 2014 International Convention Center, Jeju