

2022 SIAG/SC

SIAM Conference on Parallel
Processing for Scientific
Computing

Supercomputing Business Meeting
Thursday, February 24th, 5:15pm-6pm PST

2022 SIAG/SC BUSINESS MEETING

SIAG/SC Officers

Chair:

Lois Curfman McInnes

*

Vice Chair:

Hatem Ltaief

*

Program Director:

Michael Bader

*

Secretary:

Rio Yokota

SIAG/SC Thank you!

- **Thanks to the SIAM team** for outstanding support of SIAG/SC & SIAM-PP22
 - Special thanks to
 - **Nicole Gawel, Tim Fest, Richard Moore** (SIAG/SC support)
 - Thank you for the terrific slides!
 - **Heather Hartz, Wendy Carroll** and the **SIAM conference team**
- **Thanks to SIAG/CSE** for access to slido :-)
- **Thanks to the SIAG/SC community**
 - for many contributions to SIAM-PP22
 - for creative input to current SIAG/SC activities and new SIAG/SC initiatives

SIAG/SC Thank you to the 2020/21 Officers

Chair:

Olaf Schenk

*

Vice Chair:

Matthias Bolten

*

Program Director:

Keita Teranishi

*

Secretary:

Amanda Randles



Thanks to the outgoing officers for their fantastic work in leading our activity grp Y20-21

- Olaf Schenk (chair) [@USI_university](#)
- [@bolten](#) (vice chair)
- [@Uni_Wuppertal](#)
- [@KeitaTeranishi](#) (prog director)
- [@SandiaLabs](#)
- [@amanda_randles](#) (secretary)
- [@DukeEngineering](#)
- [#HPC @TheSIAMNews](#)



SIAG/SC Fellows

Class of 2020

Srinivas Aluru

Umit Catalyurek

Laura Grigori

Olaf Schenk

Class of 2021

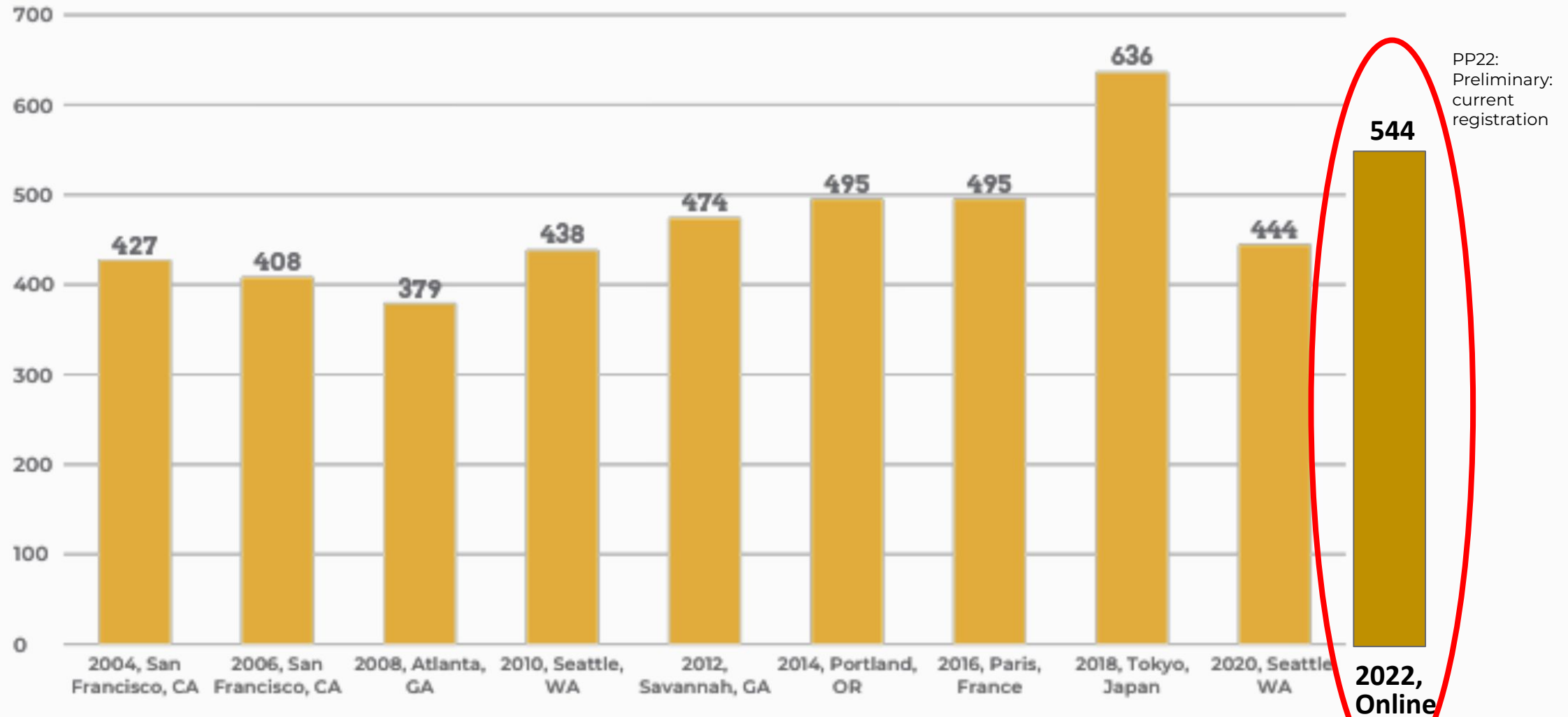
Edmond Chow

Robert Falgout

Jeremy Kepner

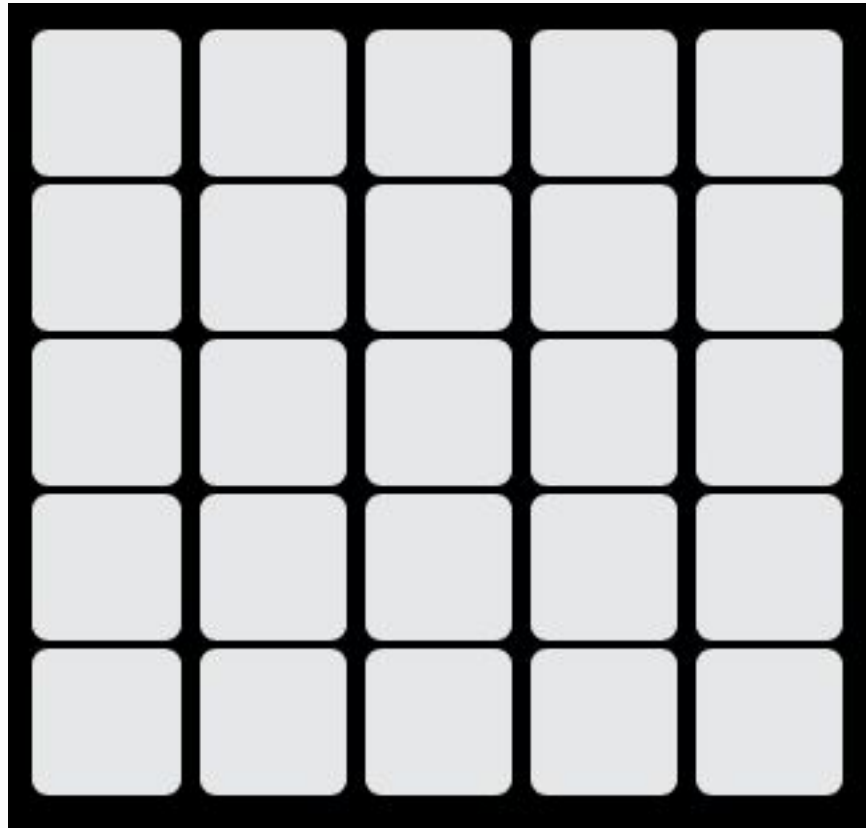
SIAG/SC Conference History

SIAM Conference on Parallel Processing for Scientific Computing (SIAM-PP)



SIAG/SC Wordle

- Not wordle! (<https://en.wikipedia.org/wiki/Wordle>)
- Just our *in-person* speaker list at #SIAMP22 :-)



SIAG/SC Parallel Processing Conference 2022

Organizing Committee Co-Chairs

Sherry Li, Lawrence Berkeley National Laboratory, U.S.

Keita Teranishi, Sandia National Laboratories, U.S.

Organizing Committee

Costas Bekas, Citadel Securities, Switzerland

Rob Bisseling, Utrecht University, the Netherlands

Matthias Bolten, Universität Wuppertal, Germany

Sunita Chandrasekaran, University of Delaware, U.S.

Anne C. Elster, Norwegian University of Science and Technology, Norway

Katsuki Fujisawa, Kyushu University, Japan

Lois Curfman McInnes, Argonne National Laboratory, U.S.

Olaf Schenk, Università della Svizzera italiana, Switzerland

Adrian Tate, NAG, United Kingdom

Steering Committee

George Biros, University of Texas, Austin, U.S.

Matthias Bolten, Universität Wuppertal, Germany

Olaf Schenk, Università della Svizzera italiana, Switzerland

Richard Vuduc, Georgia Institute of Technology, U.S.

Ulrike M. Yang, Lawrence Livermore National Laboratory, U.S.

SIAG/SC Parallel Processing Conference 2022

Proceedings Paper Committee

Hartwig Anzt, Karlsruhe Institute of Technology, Germany

Prasana Balaprakash, Argonne National Laboratory, U.S.

Grey Ballard, Wake Forest University, U.S.

Costas Bekas, Citadel Securities, Switzerland

Luc Berger-Vergiat, Sandia National Laboratories, U.S.

Paolo Bientinesi, Umeå University, Sweden

George Bosilca, University of Tennessee, Knoxville, U.S.

Eric de Sturler, Virginia Tech, U.S.

Edoardo Di Napoli, Jülich Supercomputing Center, Germany

Anshu Dubey, Argonne National Laboratory, U.S.

David Gardner, Lawrence Livermore National Laboratory, U.S.

Laura Grigori, INRIA Paris, France

Jeff Hammond, NVIDIA, U.S.

Hartmut Kaiser, Louisiana State University, U.S.

Scott Klasky, Oak Ridge National Laboratory, U.S.

Alicia Klinvex, Naval Nuclear Laboratory, U.S.

Jiajia Li, College of William and Mary, U.S.

Weifeng Liu, The China University of Petroleum, China

Yang Liu, Lawrence Berkeley National Laboratory, U.S.

Hatem Ltaief, KAUST, Saudi Arabia

Karla Morris, Sandia National Laboratories, U.S.

Sivasankaran Rajamanickam, Sandia National Laboratories, U.S.

Amanda Randles, Duke University, U.S.

Damian Rouson, Lawrence Berkeley National Laboratory, U.S.

Tetsuya Sakurai, University of Tsukuba, Japan

John Shalf, Lawrence Berkeley National Laboratory, U.S.

Stanmire Tomov, University of Tennessee, Knoxville, U.S.

Bora Uçar, ENS Lyon, France

Rich Vuduc, Georgia Institute of Technology, U.S.

Chao Yang, Peking University, China

Stefano Zampini, KAUST, Saudi Arabia

SIAG/SC Parallel Processing Conference 2022

SIAG/SC Best Paper Prize

Optimizing Communication-Avoiding Sparse LU Factorization on Multi-GPU Clusters

Friday, February 25th, 8:30-9:00 AM PST

We present a highly optimized implementation of the communication-avoiding sparse LU factorization algorithm, specifically targeting pre-exascale multi-GPU clusters such as Summit Supercomputer at Oak Ridge National Laboratory.

Prior to this work, distributed memory sparse LU factorization used GPUs mostly as a co-processor because of the relatively smaller DRAM capacity available and limited hardware support for GPU-aware message passing on older GPUs. The current pre-exascale multi-GPU clusters have relatively higher DRAM capacity and hardware support for GPU-aware MPI that allows performing the entire sparse LU factorization on GPU. The challenge is, sparse LU factorization consists of many operations on small and irregular size operands, which makes it difficult to effectively use GPU during all phases on sparse LU factorization.

To overcome such challenges, we (a) redesigned the data structure to reduce the cost of index-algebra on GPUs; b) combined streams with the so-called tree parallelism to schedule multiple operations, and; c) exploit high bandwidth GPU-2-GPU and GPU-aware MPI with the look-ahead factorization techniques to effectively overlap communication with computation.

Our proposed optimizations improve the performance of communication-avoiding sparse LU factorization by up to 3× over offload based GPU acceleration of the same algorithm on single and multiple node configurations on the Summit supercomputer.

Piyush Sao

Oak Ridge National Laboratory, U.S.

Xioaye Li

Lawrence Berkeley National Laboratory, U.S.

Richard Vuduc

Georgia Institute of Technology, U.S.

SIAG/SC Parallel Processing Conference 2022

SIAG/SC Career Prize

Scaling in Space and Time

Friday, February 25th, 9:25-9:50 AM PST

My career has centered on developing algorithms and software that scale with the next generation of high-performance computers and high-fidelity simulations. As such, multigrid methods have been a major research focus since they have the potential to exhibit optimal-order parallel and computational complexity. In this talk, I will discuss the role of multigrid methods in scientific computing, which have served mainly as fast solvers for ill-conditioned spatial systems and are now being developed in other areas such as parallel time integration, an approaching paradigm shift for computing.

Robert D. Falgout

Lawrence Livermore National Laboratory, U.S.

SIAG/SC Parallel Processing Conference 2022

SIAG/SC Prizes

Best Paper Prize

Career Prize

Early Career Prize

Next Call for Nominations Opens: March 1, 2023

At least 3 new nominations are required for an award to be given within a prize cycle.

Any SIAM-sponsored prize which receives less than three new nominations to an open call for nominations will not be awarded in that cycle. In the case that the prize is skipped for one cycle, any nominations that were received and remain eligible will be carried over to the next cycle. Carryovers do not count for the purposes of meeting minima for new nominations. But if nominators revise the package, it is then counted as a new nomination.

Help SIAG/SC honor outstanding contributions in the field of parallel scientific and engineering computing by nominating qualified individuals!

For more information visit: <https://www.siam.org/prizes-recognition/policies-guidelines/detail/prizes-and-recognition>

Future conferences?

LOCATION

TIMING

PROGRAM COMMITTEE

SIAG/SC Parallel Processing Conference 2024

Where's our next SIAM PP?

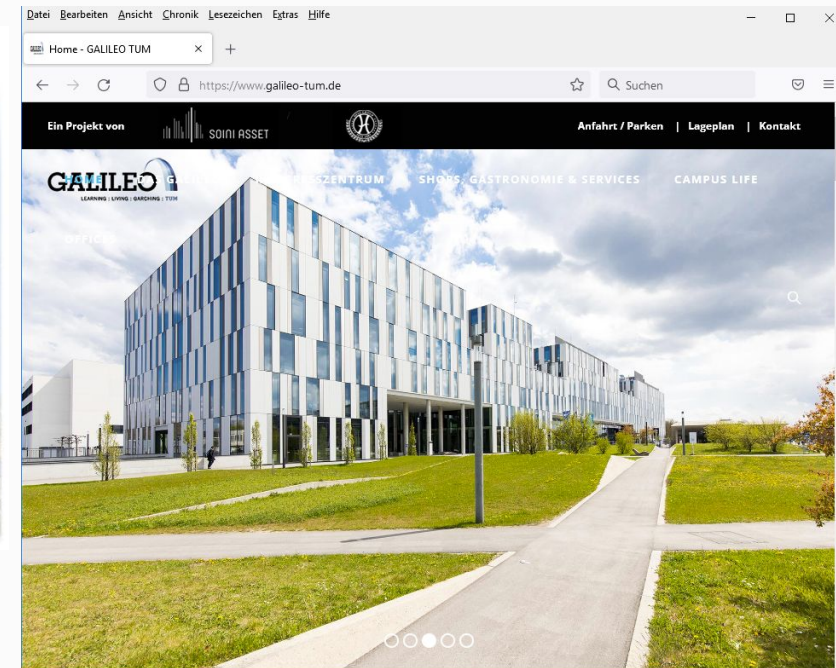
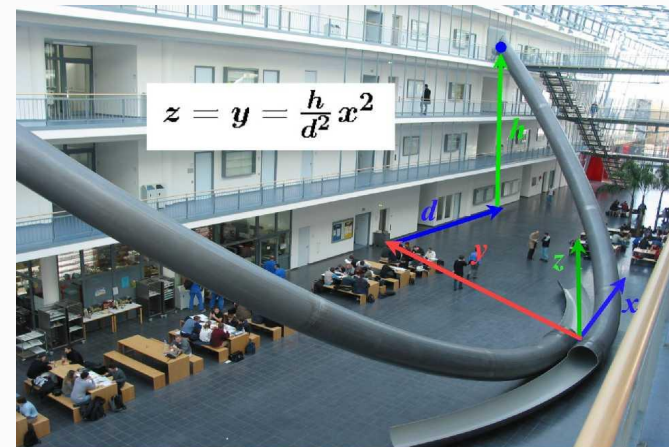
PP16: Paris

PP18: Tokyo

PP20/22: Seattle

PP24:??

One option: TUM Campus Garching (near Munich)



Science Congress Centre Munich: www.galileo-tum.de

Send us your opinions and suggestions!

slido



**SIAM-PP22 is online. Where should
PP24, PP26 be located? (pick up to 2)**

① Start presenting to display the poll results on this slide.

slido



What is your favorite part of SIAM-PP conferences?

ⓘ Start presenting to display the poll results on this slide.

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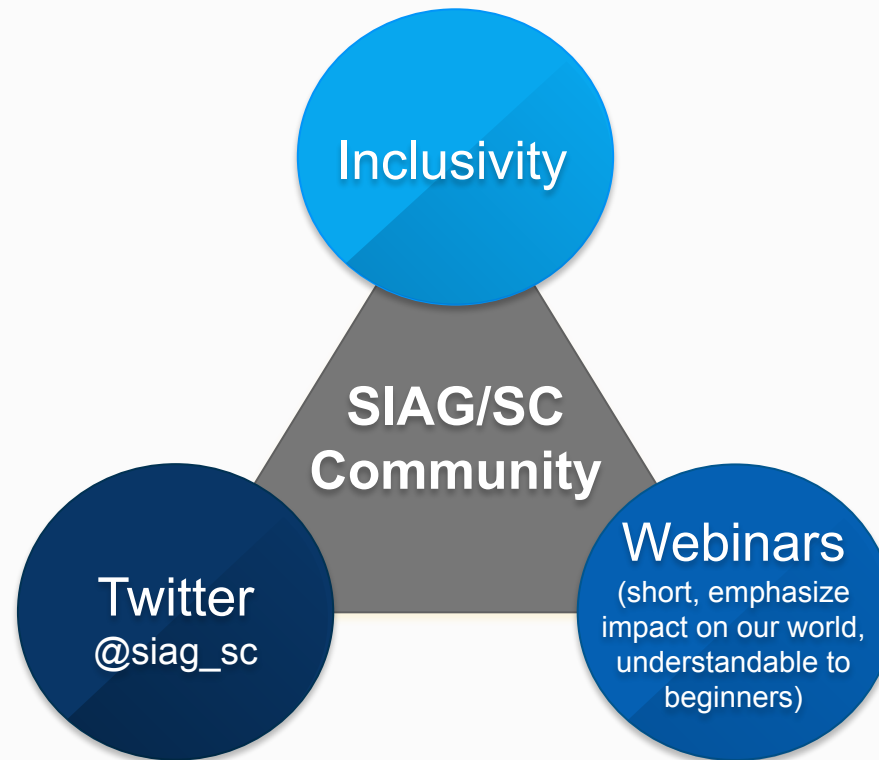


What is missing from SIAM-PP conferences?

① Start presenting to display the poll results on this slide.

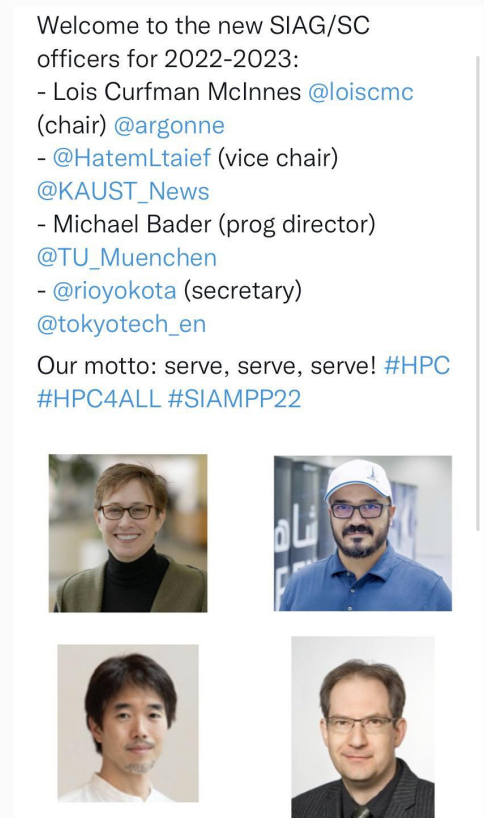
SIAG/SC Initiatives

Goals: Raise awareness of HPC opportunities and impact ... grow the HPC community



SIAG/SC Twitter

- Introducing SIAG/SC Twitter:
 - Follow us @siag_sc!
- Our first tweets: Engage with us during **#SIAMP22**



SIAG/SC Webinar Series

- Introducing a webinar series on HPC-related topics
 - Monthly, hosted via Zoom
 - **Objectives: Outreach, promote, engage, and inspire**
 - Format:
 - **Short TED-style talk (15-20 min + Q&A) - 30 min total session**
 - **Broadly understandable to students and non-experts: Emphasize impact, omit jargon**
 - Speakers: Industry, academy, national labs, etc.
 - Rotating between different time zones (US/Germany-KSA/Japan)
 - Everyone is welcome to join!
 - We want your feedback: let's switch to Slido ;-)
- Want to get involved with planning? Interest sheet signup:
<https://bit.ly/SIAG-SC-activities-interest>

slido



We are planning to start a SIAG/SC webinar series (short presentations, broadly understandable to students and non-experts: emphasize impact, omit jargon). What topics would you suggest for presentations?

① Start presenting to display the poll results on this slide.

SIAG/SC Inclusivity

- **Continue to increase efforts for inclusivity**
 - Encourage the usage of **#HPC4ALL**:
 - To share free online materials on HPC
 - To promote free online HPC events (e.g., tutorials, hack-a-thons) within underrepresented communities
 - To highlight opportunities for free remote access to hardware resources (e.g., Cloud, HPC centers)
 - And centralize such info via the SIAG/SC webpage
 - Engage vendors to further participate through their existing respective programs
 - Share info on experiences and best practices for advancing inclusivity for HPC
 - Other activities TBD
- **Get involved!**
 - Your opinions matter: Slido!
 - Interest sheet signup: <https://bit.ly/SIAG-SC-activities-interest>

slido



SIAG/SC is starting an initiative to increase inclusivity in HPC. Do you have suggestions?

ⓘ Start presenting to display the poll results on this slide.

SIAG/SC Announcements

- SIAM Engage
 - <https://engage.siam.org/communities/siag-sc-home?CommunityKey=4f08fa5b-1e64-4855-9453-1f67059976d9>
- SIAG/SC website
 - <https://www.siam.org/membership/activity-groups/detail/supercomputing>
- SIAM Blogs
- SIAM News: Story Ideas
- SIAG/SC Leadership Suggestion Form:
 - <https://www.siam.org/forms/siam-activity-group-leadership-form>

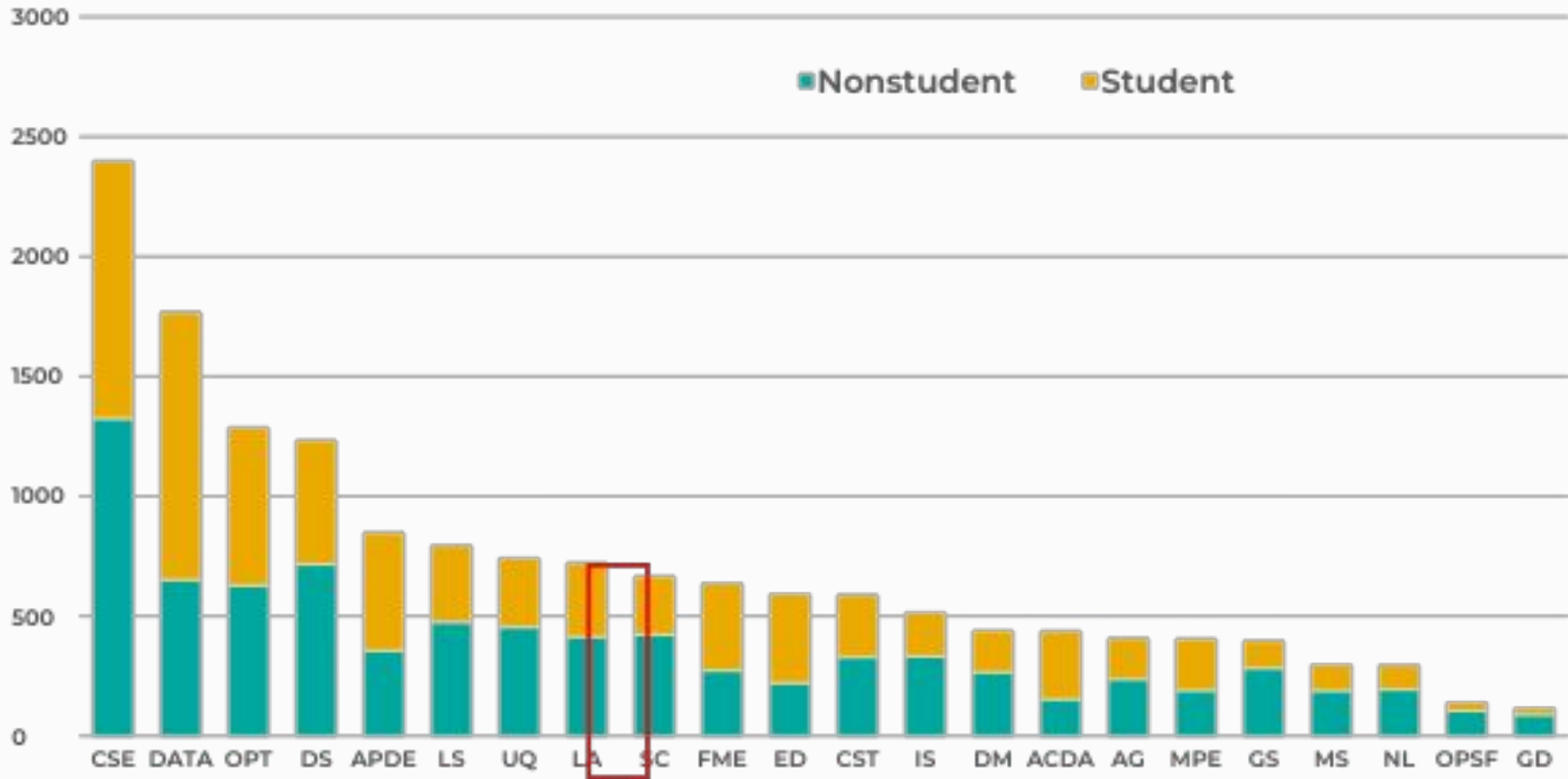
2022 SIAG/SC

Membership Report

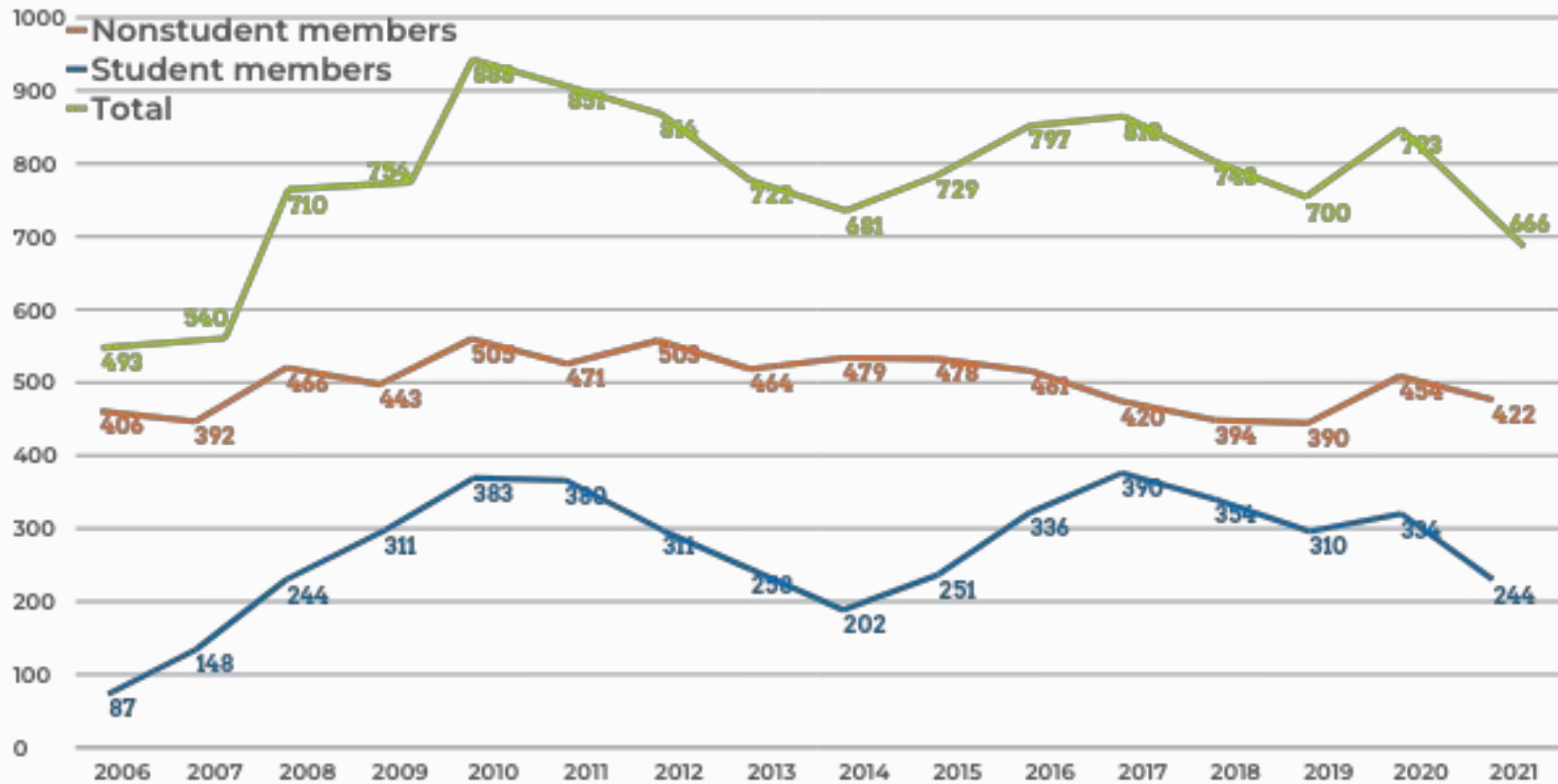
(data as of December 31, 2021)

2022 SIAG/SC BUSINESS MEETING

SIAG Overall Membership



SIAG/SC Membership Demographics

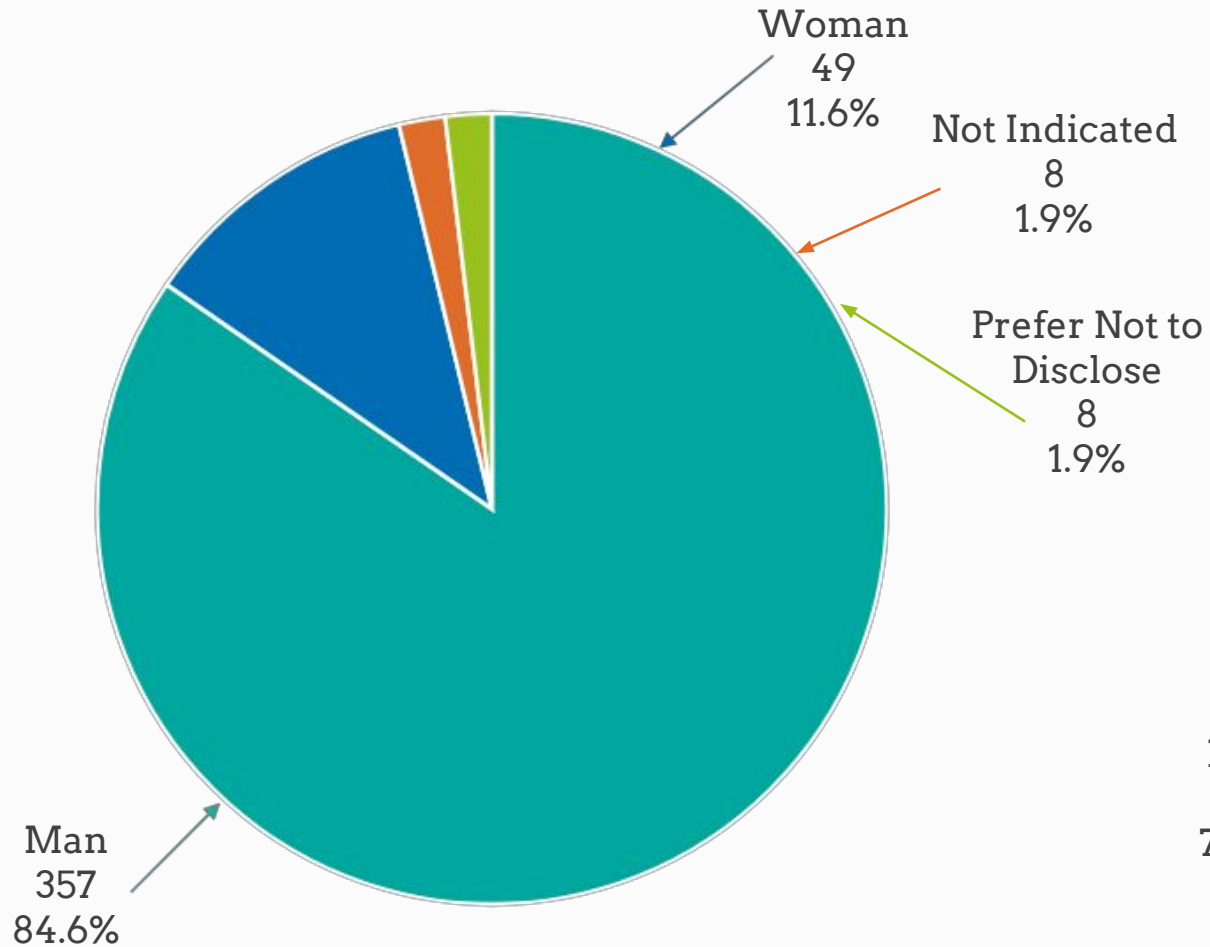


SIAG/SC Membership by Geography

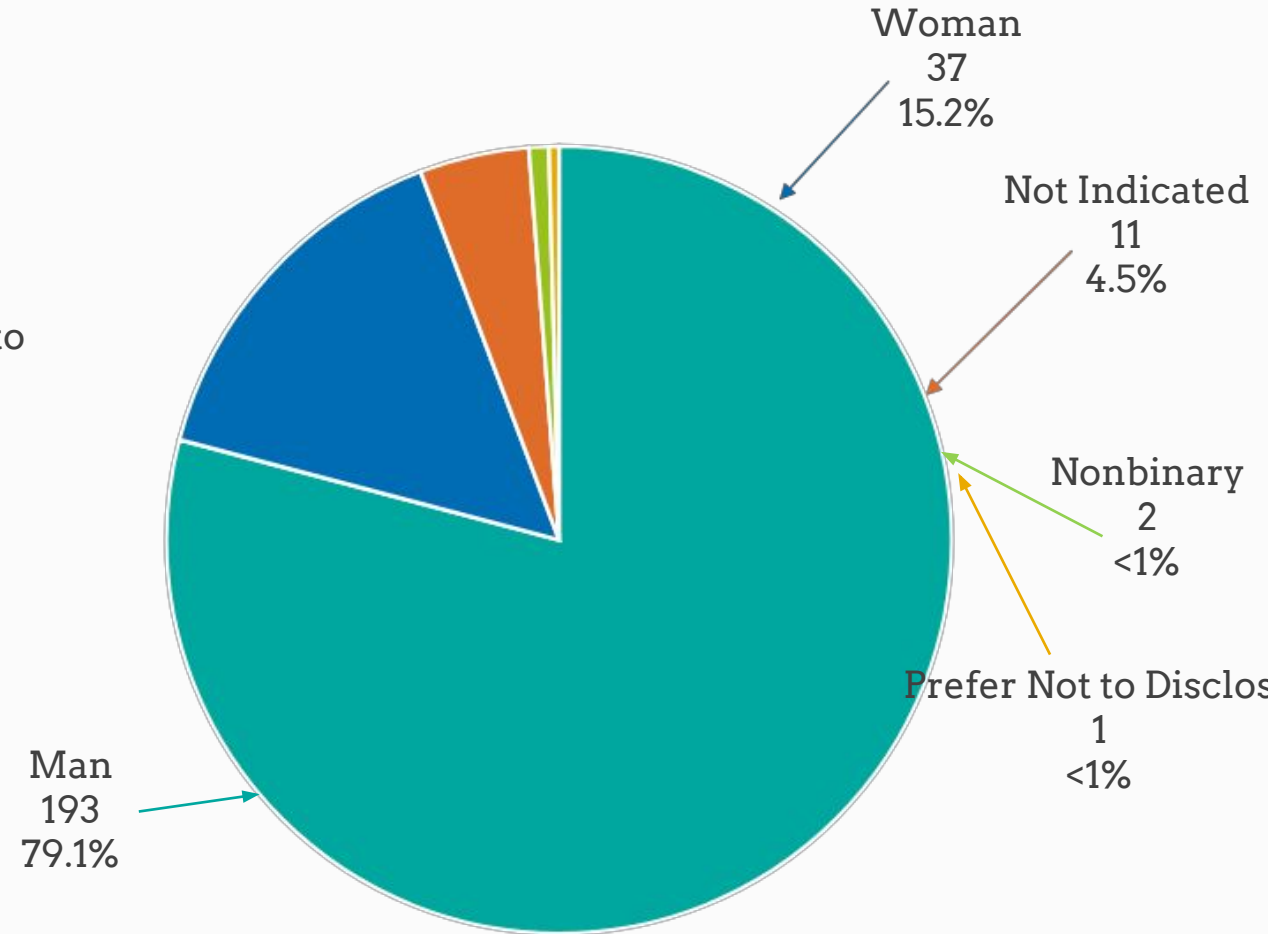
	US		Non-US		Total	
Nonstudent	293	44%	129	19%	422	63%
Student	176	26%	68	11%	244	37%
Total	469	70%	197	30%	666	

SIAG/SC Membership by Gender

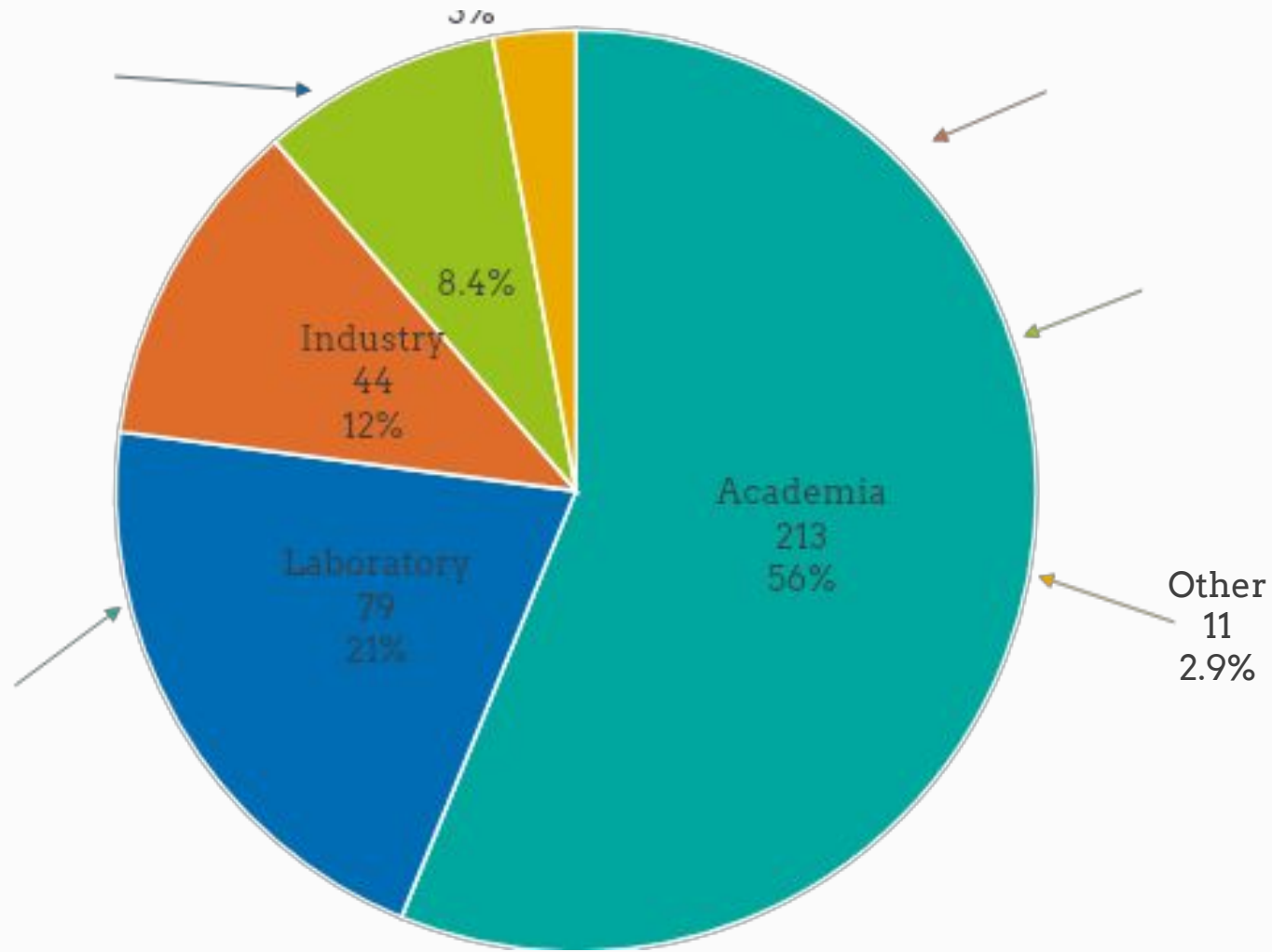
Nonstudents



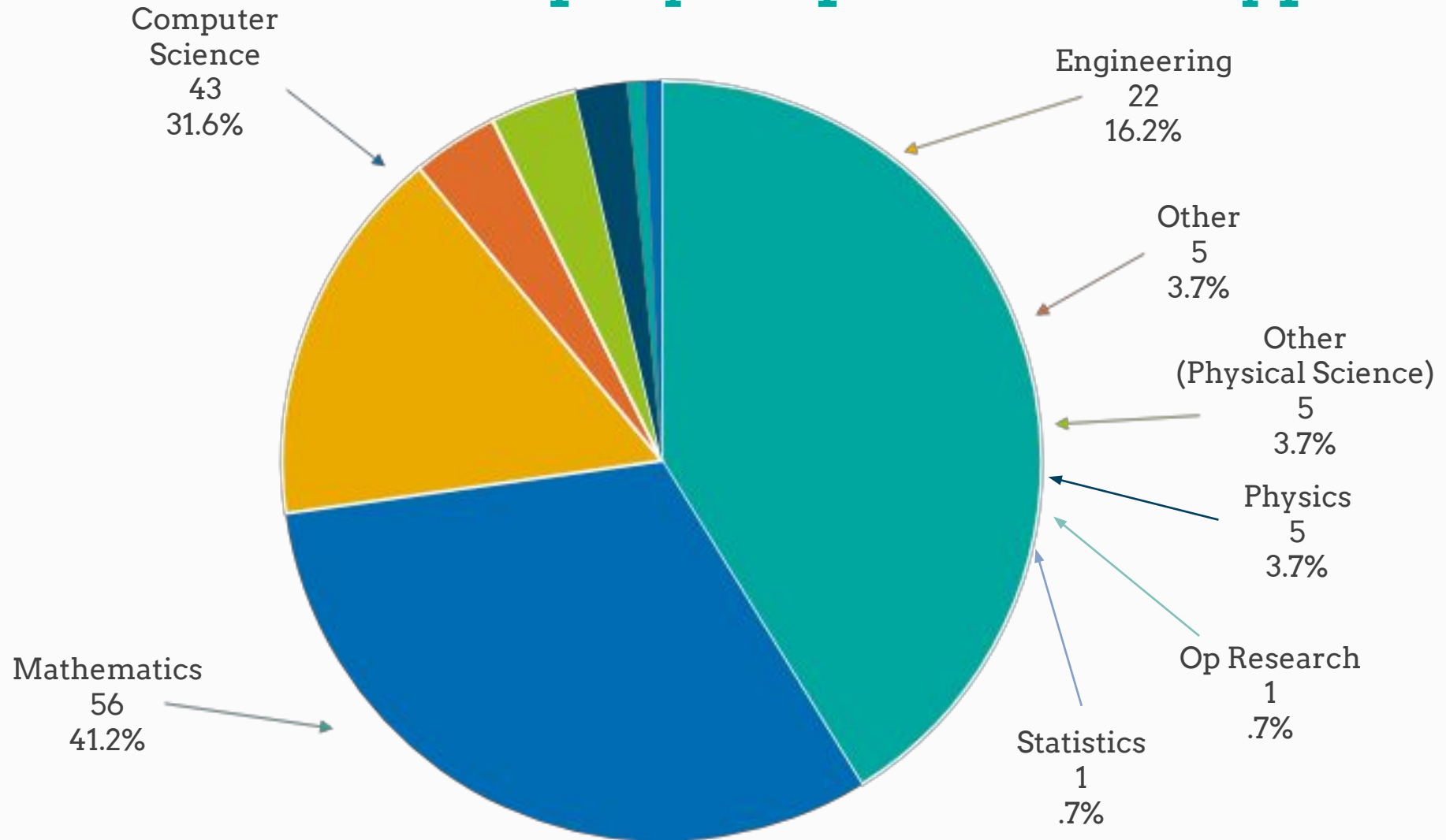
Students



SIAG/SC Membership by Employer Type



SIAG/SC Membership by Department Type



SIAM Overall

Join SIAM Today!

Benefits of SIAM Membership Include.....

- *SIAM Review* (Print & Electronic)
- *SIAM News* (Print)
- 30% Off SIAM Books
- \$15 / Activity Group Membership
- 20% - 30% Off Registrations
- 80% Off Journals (up to 4)
- 95% Off e-Access to Journals
- Spouse may join as Associate Member
- *SIAM Unwrapped*
- Vote in SIAM Elections
- Eligible to Hold Office
- Eligible for Committee Appointments
- Nominate SIAM Fellows
- Be Nominated as a SIAM Fellow
- Eligible for Group Insurance
- Nominate 2 Students for Free Membership
- Qualifying Student Members can join 2 SIAGs for *free!*

Nonmember attendees can save up to \$155 their 2022 membership!

siam 2022 | Annual Meeting

July 11th – July 15th, 2022
David L Lawrence Convention Center
Pittsburgh, Pennsylvania, U.S. **HYBRID**



The Annual Meeting provides a broad view of the state of the art in applied mathematics, computational and data science, and their applications through invited presentations, prize lectures, minitutorials, minisymposia, contributed presentations, and posters.

Organizing Committee Co-Chairs

Sunčica (Sunny) Čanić, University of California, Berkeley, U.S.
Edmond Chow, Georgia Institute of Technology, U.S.

siam 2022 | Annual Meeting

July 11th – July 15th, 2022
David L Lawrence Convention Center
Pittsburgh, Pennsylvania, U.S. **HYBRID**

Held Jointly with:

- SIAM Conference on Applied Mathematics Education (ED22)
- SIAM Conference on the Life Sciences (LS22)
- SIAM Conference on Mathematics of Planet Earth (MPE22)

Tracks of Sessions by SIAM SIAGs:

- Applied Linear Algebra
- Materials Science

Registration Deadline:

- June 13th, 2022

Hotel Registration Deadline:

- June 13th, 2022

Travel Fund Application Deadline:

- April 11, 2022 *(For all hybrid conferences, support will be prioritized for students attending the conference in-person.)*

More information available at:

<https://www.siam.org/conferences/cm/conference/an22>

Gene Golub SIAM Summer School

Financial Analytics: Networks, Learning, and High Performance Computing

August 1–12, 2022

Gran Sasso Science Institute (GSSI), L'Aquila, Italy

The school will offer an introduction to Quantitative Risk Management in Finance, Energy and Commodity Markets, Machine Learning and Financial Technology, and Mean field Games. Students will be exposed to the economic and managerial implications of these subjects, and to tools of applied probability, optimization, and computational techniques.



For more information visit: <https://www.siam.org/students-education/programs-initiatives/gene-golub-siam-summer-school>

Discussion

- **SIAG/SC Inclusivity**
- **SIAG/SC Webinar Series**
- **SIAG/SC Twitter**



- **Get involved!**

- Interest sheet signup: <https://bit.ly/SIAG-SC-activities-interest>

Contacts

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Vice Chair Hatem Ltaief
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Program Director Michael Bader
bader@in.tum.de

Secretary Rio Yokota
rioyokota@gsic.titech.ac.jp

What is next?

- **SIAG/SC** Poster session (6-8 pm PST)
 - Grab some coffee
 - Engage with authors
 - Provide constructive feedback
 - Exchange ideas

“See” you there :-)