2024 SIAG/SC

SIAM Conference on Parallel Processing for Scientific Computing

Supercomputing Business Meeting

Thursday, March 7thth, 6-6:45pm EST

siam Society for Industrial and Applied Mathematics

SIAG/SC Officers

Chair:

Ulrike Yang

*

Vice Chair:

Rio Yokota

*

Program Director:

Hartwig Anzt

*

Secretary:

Erin Carson

SIAG/SC Thank you to the 2022-23 Officers

Chair:

Lois Curfman McInnes

*

Vice Chair:

Hatem Ltaief

*

Program Director:

Michael Bader

*

Secretary:

Rio Yokota

SIAG/SC Announcements

- SIAM Engage
  - https://engage.siam.org/communities/siag-sc-home?CommunityKey=4f08fa5b-1e64-4855-9453-1f67059976d9
- SIAG/SC websites:
  - 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

SIAG/SC Fellows

Class of 2022

James Crowley

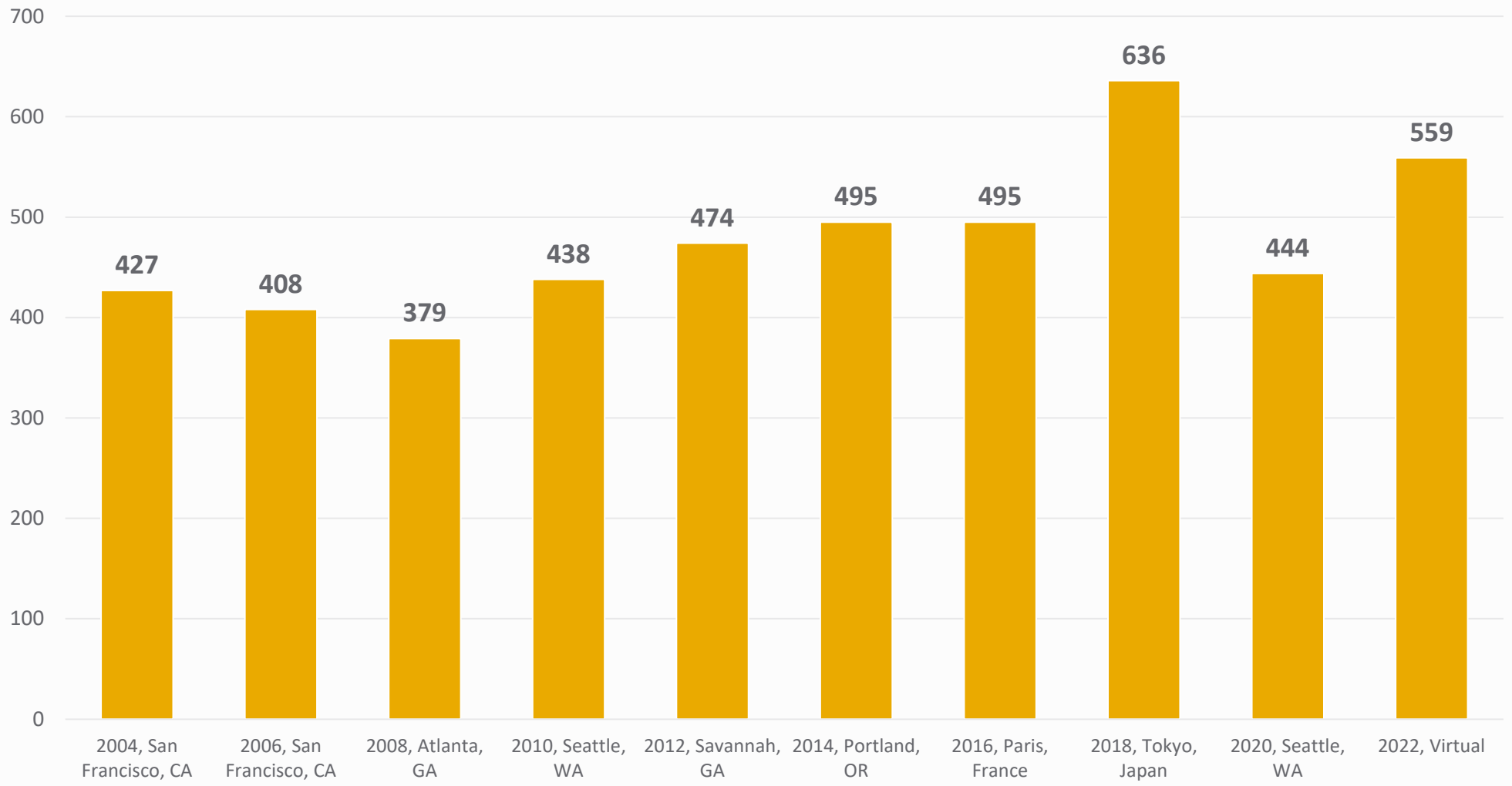
Class of 2023

George Biros

Ali Pinar

Sivan Toledo

SIAG/SC Conference History



SIAG/SC Parallel Processing Conference 2024

Organizing Committee Co-Chairs

Michael Bader, Technische Universität München, Germany
Anshu Dubey, Argonne National Laboratory, U.S.

Organizing Committee

Hartwig Anzt, University of Tennessee, U.S.
Paolo Bientinesi, Umeå University, Sweden
Aparna Chandramowlishwaran, University of California, Irvine, U.S.
Laura Grigori, EPFL, Switzerland
Jeff Hammond, NVIDIA, Finland
Jaejin Lee, Seoul National University, Republic of Korea
Bethany Lusch, Argonne National Laboratory, U.S.
Karla Morris, Sandia National Laboratories, U.S.
Johann Rudi, Virginia Tech, U.S.
Tetsuya Sakurai, University of Tsukuba, Japan

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Lois Curfman McInnes, Argonne National Laboratory, U.S.
Sherry Li, Lawrence Berkeley National Laboratory, U.S.
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SIAG/SC Parallel Processing Conference 2024

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Costas Bekas, Citadel Securities
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Oded Green, NVIDIA/Georgia Institute of Technology
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Hatem Ltaief, King Abdullah University of Science and Technology
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Christoph Niethammer, HRLS, Universität Stuttgart
Dirk Pflüger, Universität Stuttgart
Damian Rouson, Lawrence Berkeley National Laboratory
Ilya Safro, University of Delaware
John Shalf, Lawrence Berkeley National Laboratory
Michelle Strout, Hewlett Packard Enterprise (HPE)
Eric de Sturler, Virginia Tech
Stanimire Tomov, University of Tennessee Knoxville
Bora Ucar, CNRS and LIP ENS Lyon
Emil Vatai, Riken R-CCS
Stefano Zampini, King Abdullah University of Science and Technology

SIAG/SC Parallel Processing Conference 2024

SIAG/SC Best Paper Prize

Accelerating Sparse Iterative Solvers and Preconditioners Using RACE

Thursday, March 7th 8:30-9:10 AM EST

The sparse matrix-vector multiplication (SpMV) kernel is a key performance-limiting component of numerous algorithms in computational science. Despite the kernel's apparent simplicity, the sparse and potentially irregular data access patterns of SpMV and its intrinsically low computational intensity have been challenging the development of high-performance implementations of sparse algorithms over decades.

In this talk, we present methods to increase the computational intensity and thereby accelerate the performance of SpMV kernels. The method is based on the concept of levels as developed in the context of our RACE library framework. We demonstrate that one can typically achieve a speedup of 1.5-4x on a single modern Intel or AMD multicore chip for symmetric SpMV and matrix power kernels using this level-based approach. After briefly introducing the optimization strategy, we apply these optimized kernels in iterative solvers. To this end, we discuss the coupling of the RACE library with the Trilinos framework and address the application to communication-avoiding s-step Krylov solvers, polynomial preconditioners, and algebraic multigrid (AMG) preconditioners. We then dive into the performance benefits and challenges of the RACE integration and show that our optimization produces numerically identical results and improves the total solver time by 1.3x - 2x.

Christie Alappat, *Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany*
Achim Basermann, *German Aerospace Center (DLR), Germany*
Alan R. Bishop, *Los Alamos National Laboratory, U.S.*
Holger Fehske, *University of Greifswald, Germany*
Georg Hager, *Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany*
Olaf Schenk, *Università della Svizzera italiana, Switzerland*
Jonas Thies, *Delft University of Technology, The Netherlands*
Gerhard Wellein, *Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany*

SIAG/SC Parallel Processing Conference 2024

SIAG/SC Early Career Prize

Scalability and Productivity in Data-Intensive Biological Research on Massively Parallel Systems

Thursday, March 7th, 9:10-9:50 AM EST

The use of massively parallel systems continues to be critical for processing large volumes of data at an unprecedented speed and for scientific discoveries in simulation-based research areas. Today, these systems play a crucial role in new and diverse areas of data science, such as computational biology, deep learning, and data analytics. Computational biology is a key area of the rapid growth of computing. The growing volume of data and increasing complexity have outpaced the processing capacity of single-node machines in these areas, making massively parallel systems an indispensable tool. The diverse and non-trivial challenges of parallelism in these areas require computing infrastructures that go beyond the demand of traditional simulation-based sciences.

However, programming on high-performance computing (HPC) systems poses significant productivity and scalability challenges. It is important to introduce an abstraction layer that provides programming flexibility and productivity while ensuring high system performance. It is then important to map and plan the abstracted computation and communication to the underlying system to achieve optimal performance and guide the design of future large-scale architectures. As we enter the post-Moore's Law era, effective programming of specialized architectures is critical for improved performance in HPC. As large-scale systems become more heterogeneous, their efficient use for new, often irregular, and communication-intensive data analysis computation becomes increasingly complex. In this talk, we discuss how to achieve performance and scalability on extreme-scale systems while maintaining productivity for new data-intensive biological challenges, through an appropriate high-performance abstraction, namely the use of sparse matrices as well as the use of novel heterogeneous hardware.

Giulia Guidi

Cornell University and Lawrence Berkeley National Laboratory, U.S.

SIAG/SC Parallel Processing Conference 2024

SIAG/SC Career Prize

Tackling High Dimensional Problems Through Randomization and Communication Avoidance

Thursday, March 7th, 9:50-10:30 AM EST

Laura Grigori

EPFL and PSI, Switzerland

SIAG/SC Parallel Processing Conference 2024

SIAG/SC Prizes

Best Paper Prize

Career Prize

Early Career Prize

Next Call for Nominations Opens: March 1, 2025

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

SIAM 2024 Annual Meeting

July 8th – July 12th, 2024
Spokane Convention Center
Spokane, Washington, U.S.

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.

The 2024 online component will take place July 18th-20th

Organizing Committee Co-Chairs

Michael P. Friedlander, University of British Columbia, Canada
Anna Mazzucato, Pennsylvania State University, U.S.

SIAM 2024 Annual Meeting

July 8th – July 12th, 2024
Spokane Convention Center
Spokane, Washington, U.S.

Held Jointly with:

- SIAM Conference on Discrete Mathematics (DM24)
- SIAM Conference on Applied Mathematics in Education (ED24)

Tracks of Sessions by SIAM SIAGs:

- Dynamical Systems

Registration Deadline:

- June 10th, 2024

Hotel Registration Deadline:

- June 10th, 2024

Travel Fund Application Deadline:

- April 8th, 2024

- *Online component July 18th-20th*

More information available at:
https://www.siam.org/conferences/cm/conference/an24

Gene Golub SIAM Summer School

Iterative and Randomized Methods for Large-Scale Inverse Problems

July 22nd - August 2nd 2024

Campus of the Escuela Politécnica Nacional, Ladrón de Guevara E11-253, Quito, Ecuador.

Our Summer School will enable students to learn state-of-the-art mathematical and statistical tools to discover information hidden within large-scale data sets and solve complex inverse problems. Through hands-on experience with techniques from Randomized Numerical Linear Algebra, data assimilation, iterative algorithms, and inverse problems we will offer students a two-week summer school to learn this valuable range of computational mathematics topics.

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

SIAM Journals

SIAM's 18 journals are all available for download on the SIAM Publications Library (epubs.siam.org), which offers the definitive source for the final, peer-reviewed version of every published article - so be sure to utilize it!

Questions about using epubs.siam.org? Contact service@siam.org for a user guide and personal assistance!

Future conferences?

LOCATION

TIMING

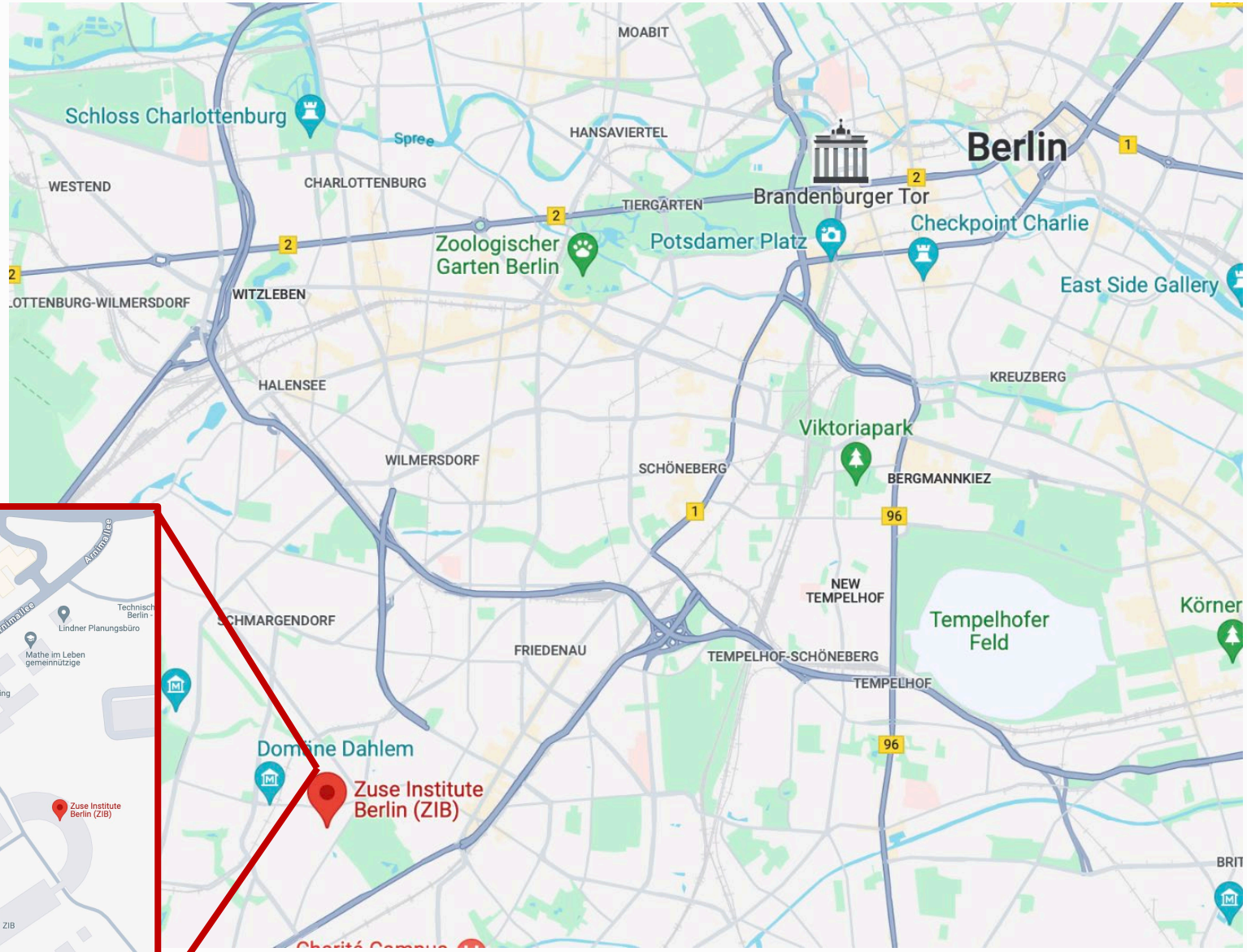
PROGRAM COMMITTEE

SIAM PP 2026 Proposal

BERLIN, GERMANY

Location

Freie Universität Berlin (FU Berlin)
& Zuse Institute Berlin



Amenities

- Biology Big Lecture Hall (550 seats)
- Biology Lecture Hall A (200 seats)
- Computer Science Lecture Hall (200 seats)
- Zuse Institute Lecture Hall (159 seats)
- Mathematics Lecture Hall (123 seats)
- Biology Lecture Hall B (100 seats)
- Computer Science Seminar Room SR005 (70 seats)
- Computer Science Seminar Room SR006 (50 seats)
- Computer Science Seminar Room SR049 (40 seats)
- Computer Science Seminar Room SR046 (40 seats)
- Computer Science Seminar Room SR055 (32 seats)
- Computer Science Seminar Room SR053 (30 seats)
- Computer Science Seminar Room SR051 (30 seats)
- Zuse Institute Seminar Room (40 seats)

- Computer Science Foyer (200 m², ca 70 attendees)
- Zuse Institute Foyer (209 m², ca 75 attendees)
- Biology Foyer (450 m², ca 250 attendees)

Keynotes

Plenary sessions

Minisymposia

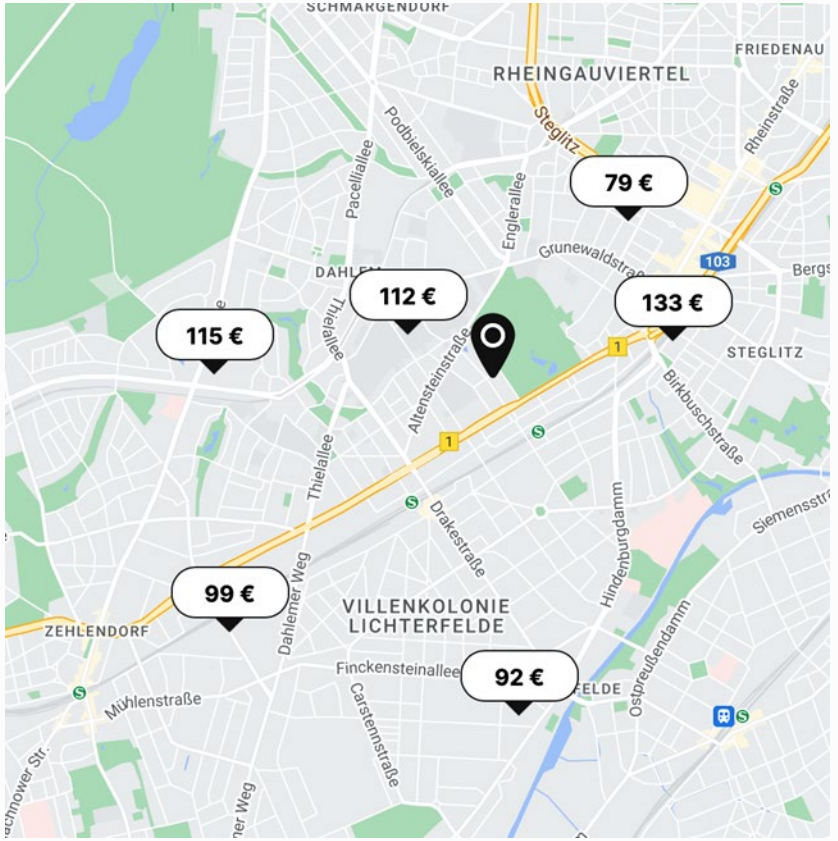
Housing

Neighborhood

- Seminaris Campus Hotel *150€*
- Steglitz International *120€*
- Pension Dahlem *95€*

City

- B&B City West *140€*
- Castell am Kurfürstendamm *110€*
- Premier Inn *145€*
- SANA Berlin *200€*
- Palace *240€*
- Double Tree Hilton *250€*
- many more…



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 $160 their 2022 membership!

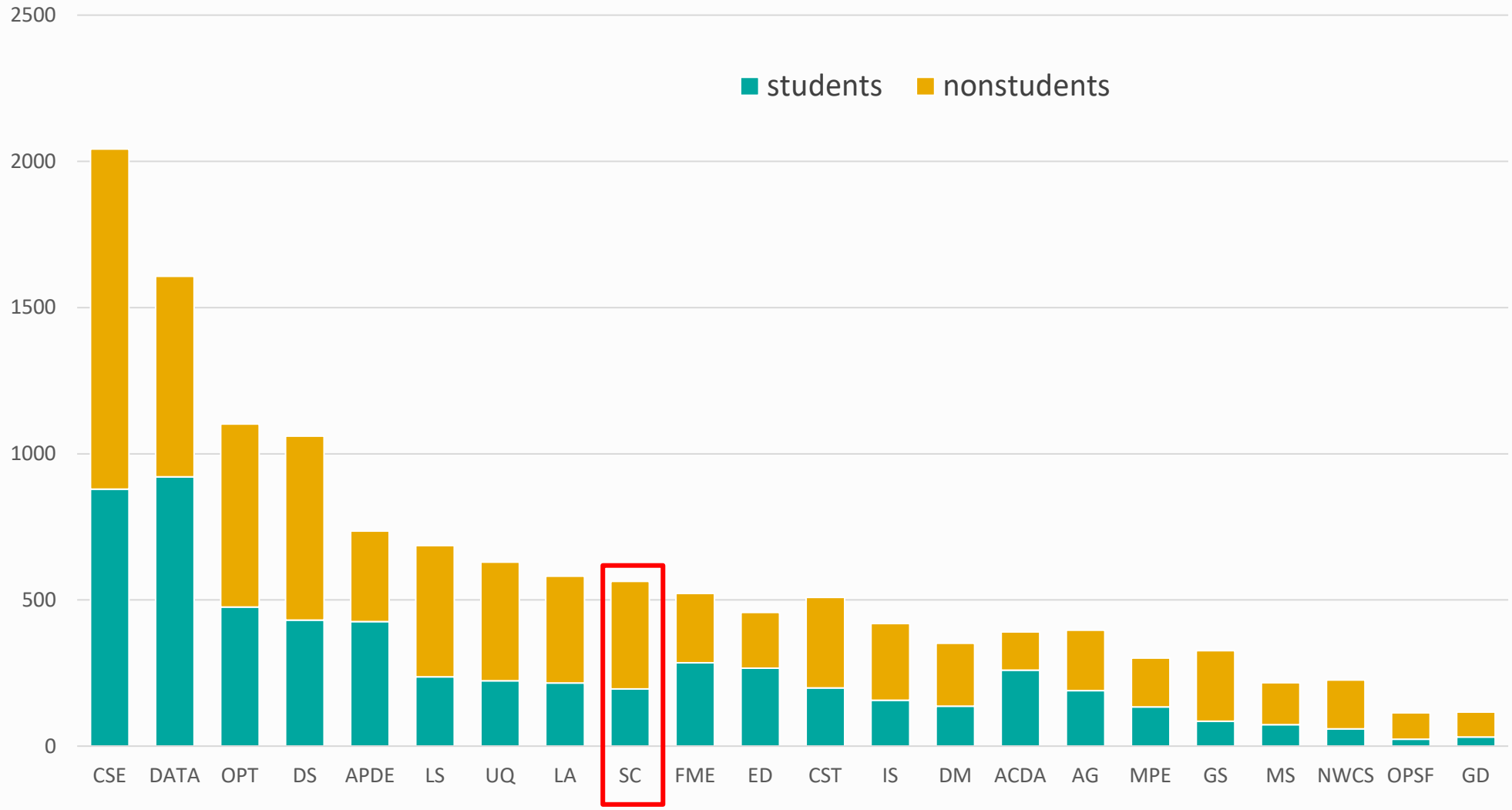
2024 SIAG/SC

Membership Report

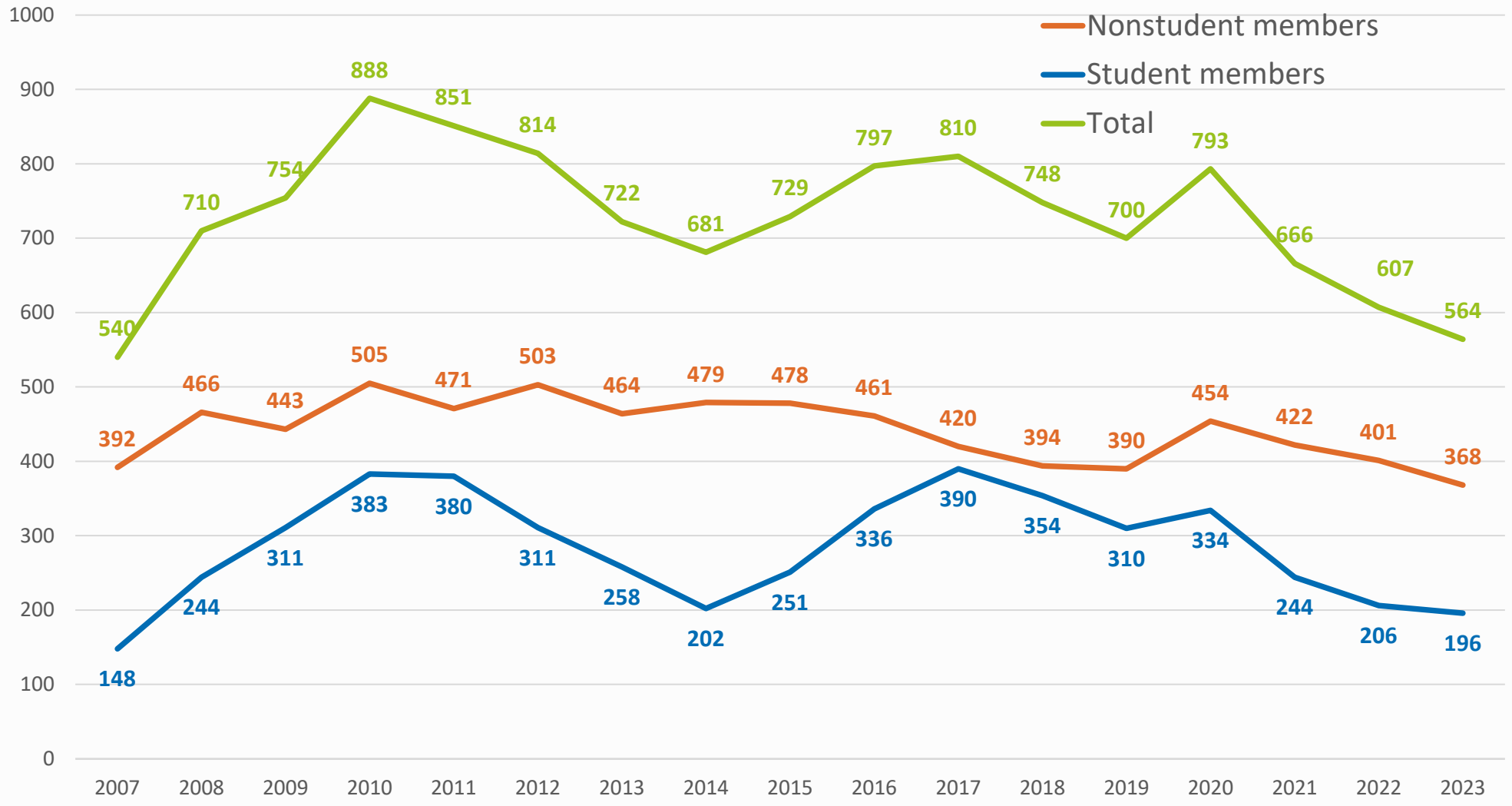
(data as of December 31, 2023)

siam Society for Industrial and Applied Mathematics

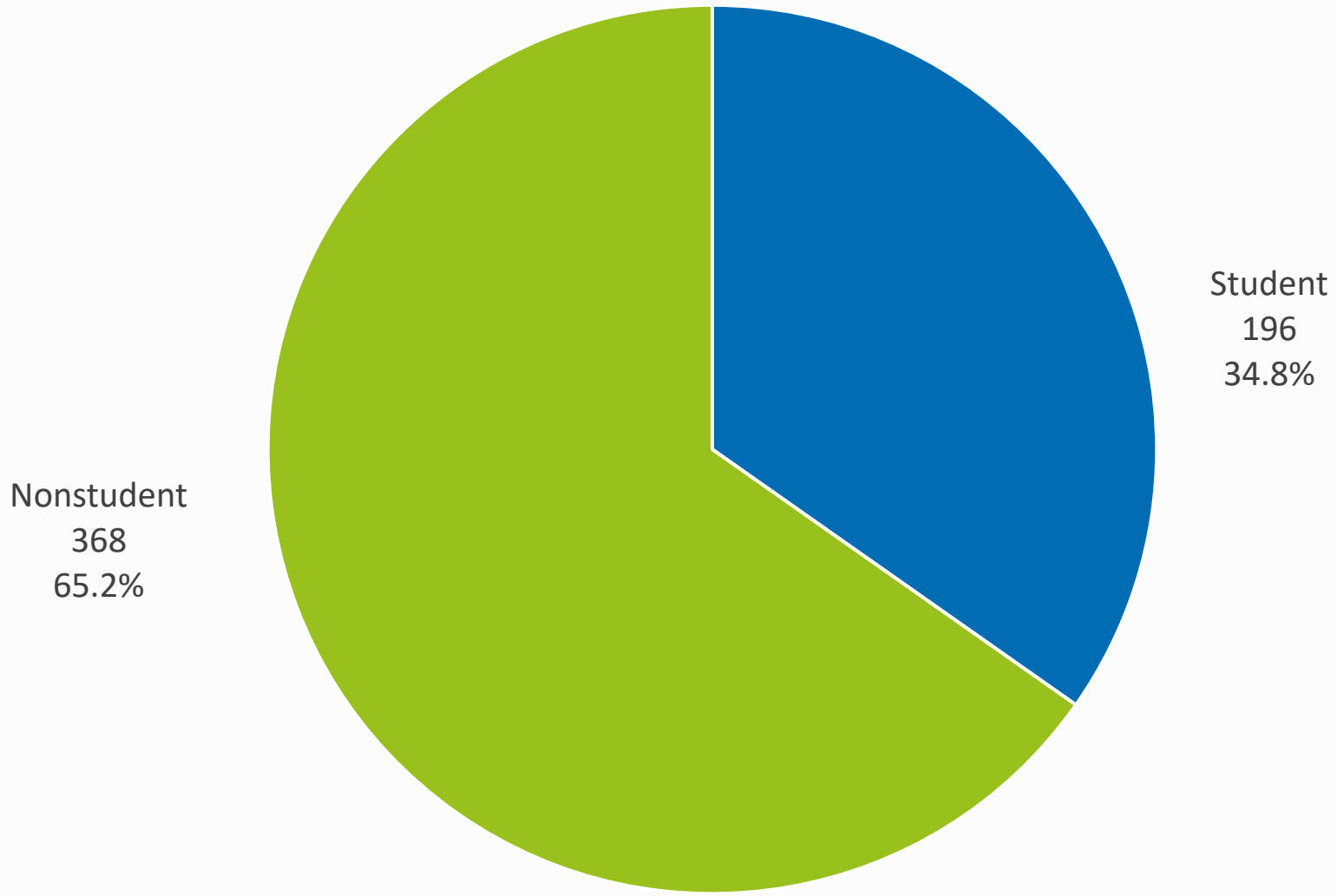
SIAG Overall Membership



SIAG/SC Membership Demographics



SIAG/SC Membership Demographics

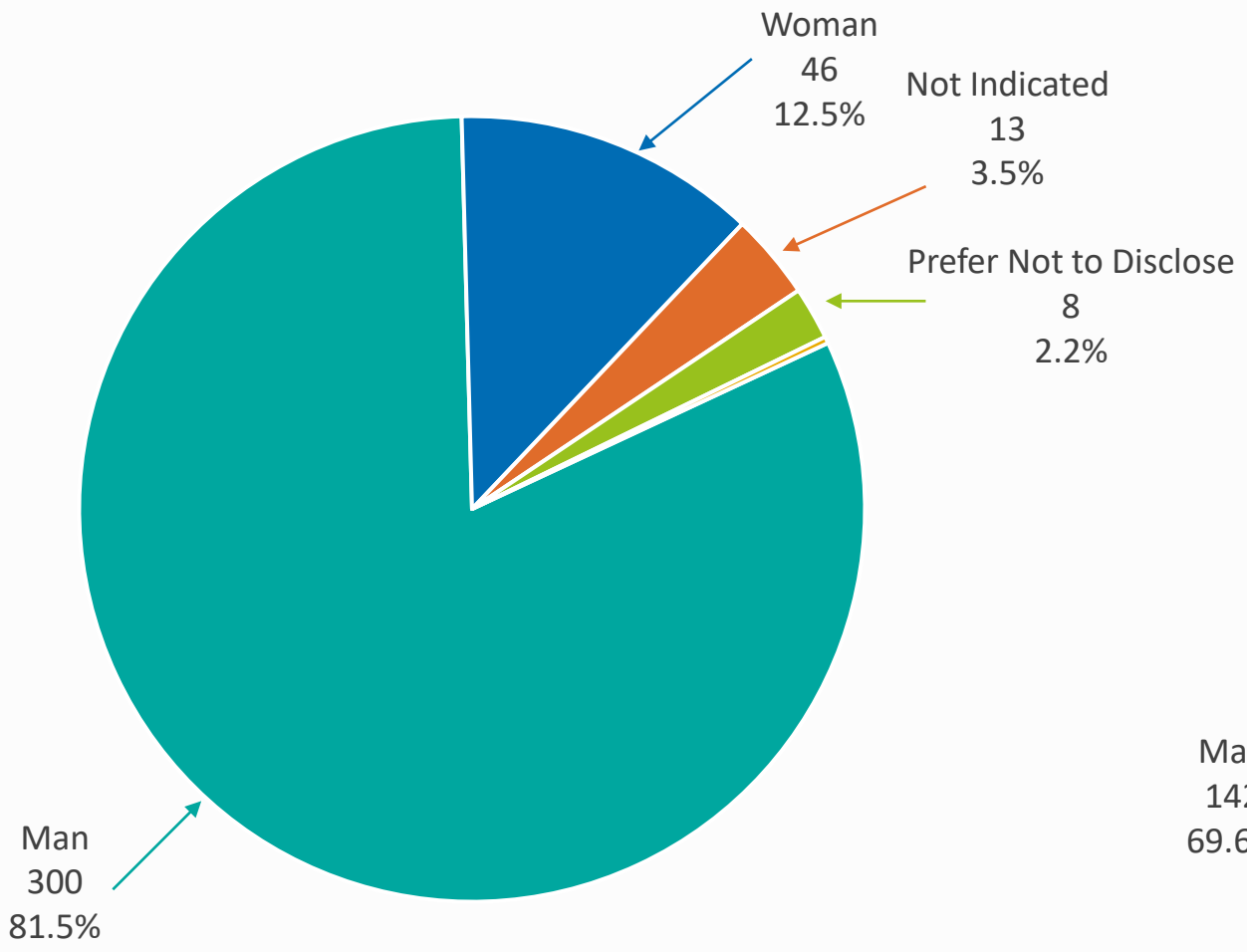


SIAG/SC Membership by Geography

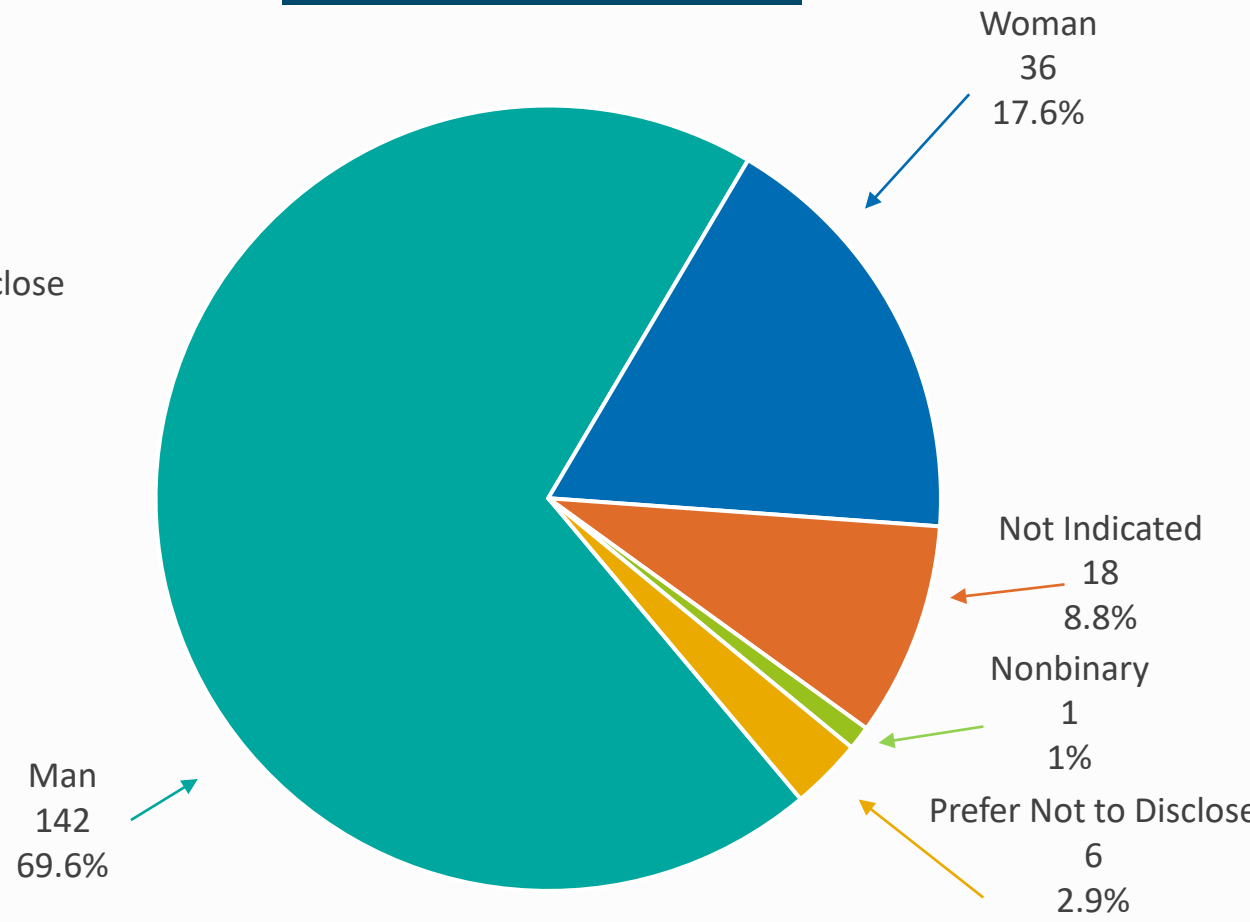
	US		Non-US		Total	
Nonstudent	257	45%	112	19%	369	65%
Student	117	20%	86	16%	203	35%
Total	374	65%	198	35%	572	

SIAG/SC Membership by Gender

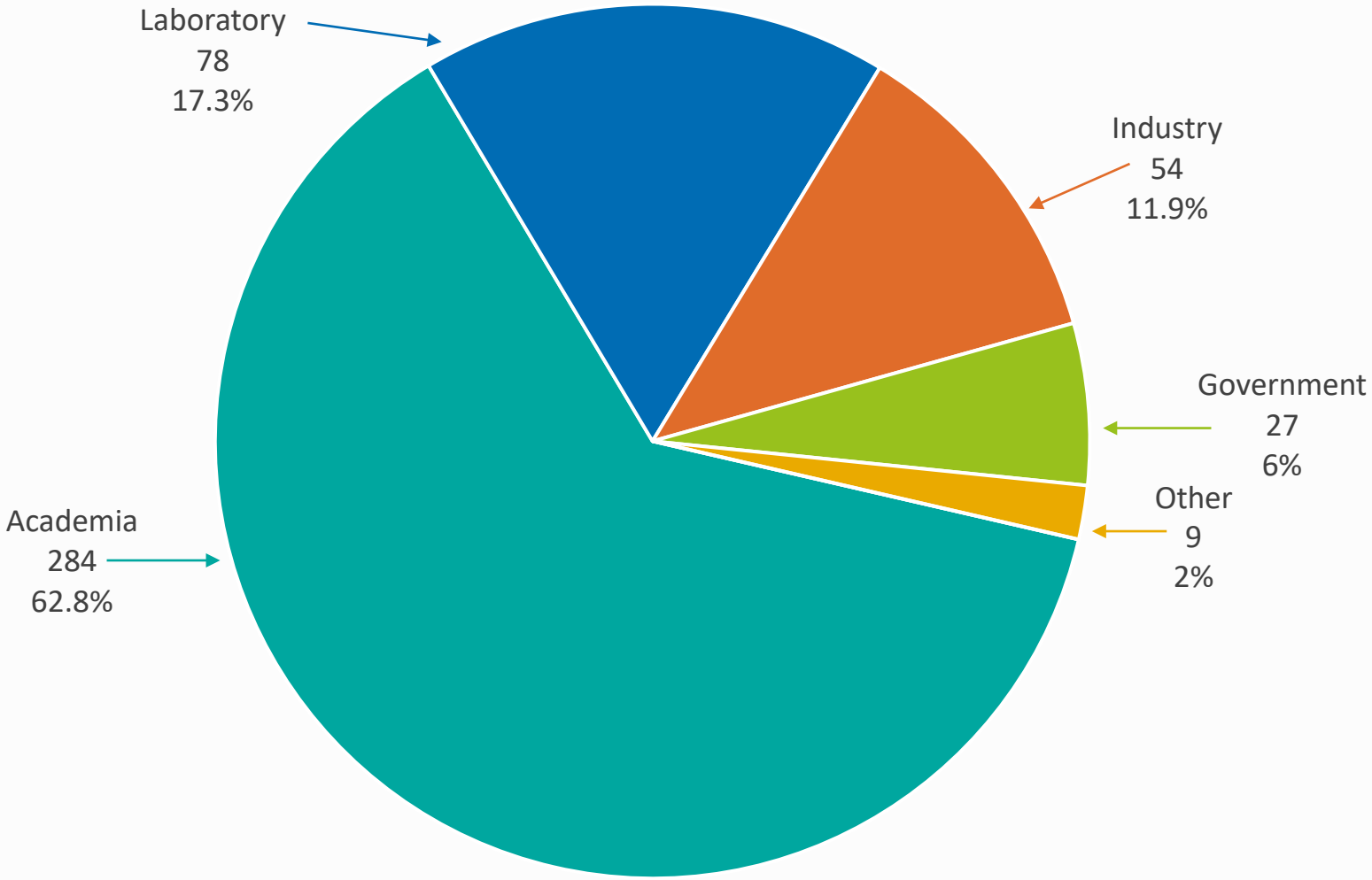
Nonstudents



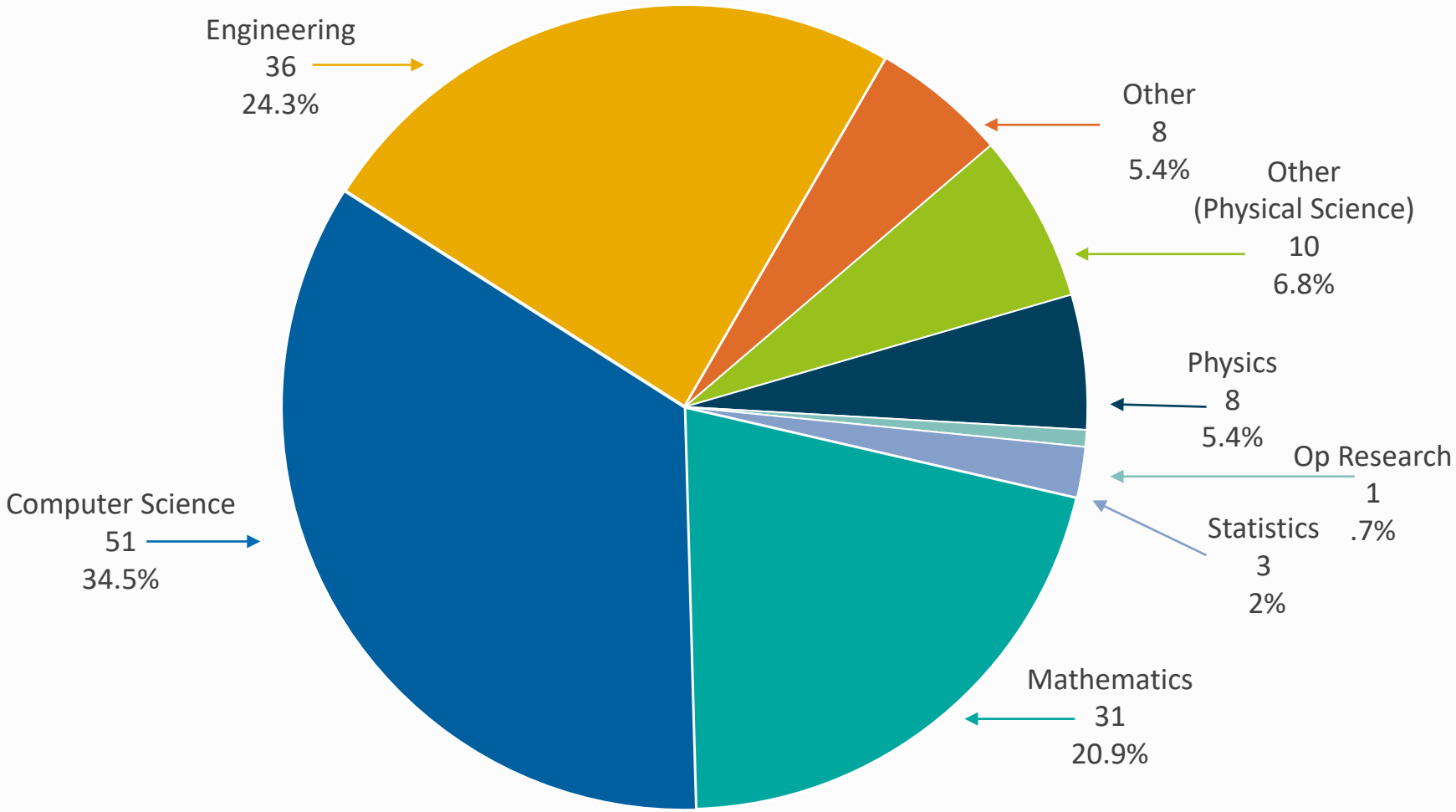
Students



SIAG/SC Membership by Employer Type



SIAG/SC Membership by Department Type



Other Business

Contacts

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Vice Chair	Rio Yokota rioyokota@gsic.titech.ac.jp
Program Director	Hartwig Anzt hartwig.anzt@tum.de
Secretary	Erin Carson carson@karlin.mff.cuni.cz