

RESEARCH INTERESTS

Applied and Computational Mathematics, Numerical Methods for Partial Differential Equations, Scientific Computing, Computational Science (Computational Fluid Dynamics and Solid Mechanics), Modeling and Simulation, High-order Methods, High-performance Scientific Computing, Numerical Weather and Climate Prediction, Computational Geometry, Computer Graphics, Computer Aided Geometric Design (CAGD).

EDUCATION

- PhD in Applied Mathematics (A.Y. 2012/2013 – A.Y. 2017/2018)
New Jersey Institute of Technology, Newark, NJ, USA (joint program with Rutgers University).
PhD dissertation entitled *Numerical Simulations of Thin Viscoelastic Films*. Advisors: Shahriar Afkhami, Lou Kondic, and Shawn Chester.
- Exchange Program (A.Y. 2011/2012)
New Jersey Institute of Technology, Newark, NJ, USA
- Master of Science in Mathematics, *summa cum laude* (A.Y. 2008/2009 – A.Y. 2010/2011)
Università degli Studi di Siena, Siena, Italy.
Master's thesis on Catmull-Clark subdivision surfaces.
- Bachelor of Science in Mathematics (A.Y. 2005/2006 – A.Y. 2007/2008)
Università degli Studi di Siena, Siena, Italy.
Bachelor's thesis on the fourth dimension in Euclidean geometry and its representation in art and history.

ACADEMIC APPOINTMENTS

- Assistant Professor, *Department of Mathematics & Statistics, Computational Science Research Center* (01/24–present)
San Diego State University
- Research Software Engineer, *Climate Modeling Alliance (CliMA)* (10/20–01/24)
California Institute of Technology
- PostDoctoral Research Associate, *Center for Efficient Exascale Discretizations (CEED)* (06/18–09/20)
University of Colorado at Boulder

REFEREED PUBLICATIONS (* INDICATES ADVISEES)

2026:

- D. Yatunin, S. Byrne, C. Kawczynski, S. Kandala, G. Bozzola, A. Sridhar, Z. Shen, A. Jaruga, J. Sloan, J. He, D. Z. Huang, **V. Barra**, R. Chew, A. Boral, Y. Chen, O. Knuth, P. Ullrich, C. Mbengue, T. Schneider, *The Climate Modeling Alliance Atmosphere Dynamical Core: Concepts, Numerics, and Scaling*, **Journal of Advances in Modeling Earth Systems (JAMES)**, **18**, (2026)

2023:

- A. Souza, J. He, T. Bischoff, M. Waruszewski, L. Novak, **V. Barra**, T. Gibson, A. Sridhar, S. Kandala, S. Byrne, L. Wilcox, J. Kozdon, F. Giraldo, R. Ferrari, J. Marshall, T. Schneider, O. Knuth, *The Flux-Differencing Discontinuous Galerkin Method Applied to an Idealized Fully Compressible Nonhydrostatic Dry Atmosphere*, **Journal of Advances in Modeling Earth Systems (JAMES)**, **15**, (2023)

2022:

- B. Adeyemi*, P. Jadhawar, L. Akanji, **V. Barra**, *Interfacial stability of bounded viscoelastic thin films with gradient of interfacial tension*, **Journal of Non-Newtonian Fluid Mechanics**, **309**, (2022)

2021:

- A. Abdelfattah, **V. Barra**, N. Beams, R. Bleile, J. Brown, J-S. Camier, R. Carson, N. Chalmers, V. Dobrev, Y. Dudouit, P. Fischer, A. Karakus, S. Kerkemeier, Y-H. Lan, E. Merzari, M. Min, M. Phillips, T. Rathnayake, R. Rieben, T. Stitt, A. Tomboulides, S. Tomov, V. Tomov, A. Vargas, T. Warburton, K. Weiss, *GPU Algorithms for Efficient Exascale Discretizations*, **Parallel Computing**, **108**, (2021)
- J. Brown, A. Abdelfattah, **V. Barra**, N. Beams, J-S. Camier, V. Dobrev, Y. Dudouit, L. Ghaffari, T. Kolev, D. Medina, W. Pazner, T. Ratnayaka, J. Thompson, S. Tomov, *libCEED: Fast algebra for high-order element-based discretizations*, **Journal of Open Source Software**, **6**, (2021)

- A. Mehraban, J. Thompson, J. Brown, R. Regueiro, **V. Barra**, H. Tufo, *Simulating Compressible and Nearly-Incompressible Linear Elasticity Using An Efficient Parallel Scalable Matrix-Free High-order Finite Element Method*, 14th World Congress on Computational Mechanics (WCCM) - European Community on Computational Methods in Applied Sciences (ECCOMAS) Congress 2020, (2021)
- T. Kolev, P. Fischer, M. Min, J. Dongarra, J. Brown, V. Dobrev, T. Warburton, S. Tomov, M. Shephard, A. Abdelfattah, **V. Barra**, N. Beams, J-S. Camier, N. Chalmers, Y. Dudouit, A. Karakus, I. Karlin, S. Kerkemeier, Y-H. Lan, D. Medina, E. Merzari, A. Obabko, W. Pazner, T. Rathnayake, C. Smith, L. Spies, K. Swirydowicz, J. Thompson, A. Tomboulides, V. Tomov, *Efficient Exascale Discretizations: High-order finite element methods*, **International Journal of High Performance Computing Applications**, 35, (2021)
- A. Mehraban, J. Brown, **V. Barra**, H. Tufo, J. Thompson, R. Regueiro, *Efficient Residual and Matrix-free Jacobian Evaluation for Three-Dimensional Tri-Quadratic Hexahedral Finite Elements with Nearly-Incompressible Neo-Hookean Hyperelasticity applied to Soft Materials on Unstructured meshes in Parallel, with PETSc and libCEED*, Proceedings of the ASME 2020 International Mechanical Engineering Congress and Exposition. Vol. 12: Mechanics of Solids, Structures, and Fluids, (2021)

2020:

- **V. Barra**, J. Brown, J. Thompson, Y. Dudouit, *High-performance operator evaluations with ease of use: libCEED's Python interface*, Proceedings of the 19th Python in Science Conference, (2020)

2019:

- **V. Barra**, S. Afkhami, L. Kondic, *Thin viscoelastic dewetting films of Jeffreys type subjected to gravity and substrate interactions*, **The European Physical Journal E**, 42, (2019)

2018:

- **V. Barra**, S. Chester, S. Afkhami, *Numerical simulations of nearly incompressible viscoelastic membranes*, **Computers & Fluids**, 175, (2018)

2016:

- **V. Barra**, S. Afkhami, L. Kondic, *Interfacial dynamics of thin viscoelastic films and drops*, **Journal of Non-Newtonian Fluid Mechanics**, 237, (2016)

PREPRINTS AND MANUSCRIPTS IN PREPARATION

- J. Brown, **V. Barra**, N. Beams, L. Ghaffari, M. Knepley, W. Moses, R. Shakeri, J. Thomspson, J. Zhang, *Performance Portable Solid Mechanics via Matrix-Free p-Multigrid*, submitted to the **SIAM Journal on Scientific Computing (SISC)**

TECHNICAL REPORTS, MANUALS, CORRESPONDENCE, AND THESIS

2025:

- **V. Barra**, A. Boada, J. Brzenski, J. Castillo, P. Chakalasiya, S. C. Singh, J. D. Corbino, T. Drummond, M. Dumett, J. Hellmers, A. Ilaty, K. Kaviani, O. Nzerem, G. Pagallo, C. Paolini, V. Rosano, A. M. Srinivas, J. P. Srinivasan, M. Valera, *MOLE User Manual*

2021:

- Braga, V. Francioni, **V. Barra**, C. Falcone, G. String, *Call to update US re-entry rules for international researchers*, **Nature**, 596, (2021)

2020:

- A. Abdelfattah, **V. Barra**, N. Beams, J. Brown, J-S. Camier, V. Dobrev, Y. Dudouit, L. G., T. Kolev, D. Medina, T. Rathnayake, J. Thompson, S. Tomov, *libCEED User Manual*
- T. Kolev, P. Fischer, A. Abdelfattah, **V. Barra**, N. Beams, J. Brown, J-S. Camier, N. Chalmers, V. Dobrev, S. Kerkemeier, Y-H. Lan, E. Merzari, M. Min, M. Phillips, T. Ratnayaka, K. Rowe, J. Thompson, A. Tomboulides, S. Tomov, V. Tomov, T. Warburton, *CEED ECP Milestone Report: Support CEED-enabled ECP applications in their preparation for Aurora/Frontier*
- T. Kolev, P. Fischer, A. Abdelfattah, S. Ananthan, **V. Barra**, N. Beams, R. Bleile, J. Brown, R. Carson, J-S. Camier, M. Churchfield, V. Dobrev, J. Dongarra, Y. Dudouit, A. Karakus, S. Kerkemeier, Y-H. Lan, D. Medina, E. Merzari, M. Min, S. Parker, T. Ratnayaka, C. Smith, M. Sprague, T. Stitt, J. Thompson, A. Tomboulides, S. Tomov, V. Tomov, A. Vargas, T. Warburton, K. Weiss, *CEED ECP Milestone Report: Improve performance and capabilities of CEED-enabled ECP applications on Summit/Sierra*

2019:

- S. Tomov, A. Abdelfattah, **V. Barra**, N. Beams, J. Brown, J-S. Camier, V. Dobrev, J. Dongarra, Y. Dudouit, P. Fischer, A. Karakus, S. Kerkemier, T. Kolev, Y-H. Lan, E. Merzari, M. Min, A. Obabko, S. Parker, T. Ratnayaka, J. Thompson, A. Tomboulides, V. Tomov, T. Warburton, *CEED ECP Milestone Report: Performance tuning of CEED software and 1st and 2nd wave apps*
- M. Shephard, **V. Barra**, J. Brown, J-S. Camier, V. Dobrev, Y. Dudouit, P. Fischer, T. Kolev, D. Medina, M. Min, T. Ratnayaka, C Smith, M. Siboni, J. Thompson, T. Warburton, *CEED ECP Milestone Report: Improved Support for Parallel Adaptive Simulation in CEED*
- J. Brown, A. Abdelfattah, **V. Barra**, V. Dobrev, Y. Dudouit, P. Fischer, T. Kolev, David Medina, Misun Min, Thilina Ratnayaka, Cameron Smith, Jeremy Thompson, Stanimire Tomov, Vladimir Tomov, Tim Warburton, *CEED ECP Milestone Report: Public release of CEED 2.0*

2018:

V. Barra, *Numerical Simulations of Thin Viscoelastic Films*, PhD dissertation, **New Jersey Institute of Technology**, (2018)

INVITED TALKS AND SEMINARS

2026:

- *Stable Numerics for Incompressible and Compressible Flows*, Computational/Applied Math Seminar, Arizona State University, Tempe, AZ, USA (online) (04/13)

2025:

- *From nanofilms and droplets to dycores and couplers: a numerical modeling journey*, *Climate and Atmosphere seminar at the Scripps Institution of Oceanography*, **University of California San Diego**, San Diego, CA, USA (04/25)
- *Composable operators from long waves to Earth system models*, Colloquium in the Department of Mathematics and Statistics, **CalPoly Pomona**, Pomona, CA, USA (online) (03/25)

2024:

- *Efficient numerical simulations for fluid dynamics across different scales*, Computational Science Research Center Colloquium, **San Diego State University**, San Diego, CA, USA (12/06)

2023:

- *Emergent nonlinearities and fast solvers for fluids from small to global scales* [slides], Computational Science Research Center Colloquium, **San Diego State University**, San Diego, CA, USA (03/23)

2022:

- *Nonlinear paths: career perspectives with a PhD in Math* [slides], NJIT Mathematical Sciences Department Alumni Seminar, **NJIT**, Newark, NJ, USA (06/16)

2020:

- *Composition of efficient, scalable solvers for performance-portable applications*, Computational Research Division, **Lawrence Berkeley National Laboratory** (LBNL), Berkeley, CA, USA (03/16, online)
- *A light-weight library for performance-portable high-order operators: libCEED*, Computing and Computational Sciences Directorate, **Oak Ridge National Laboratory** (ORNL), Oak Ridge, TN, USA (03/09)
- *Toward efficient, high-order solvers for Computational Fluid Dynamics applications*, Global Systems Laboratory Seminar, **National Oceanic and Atmospheric Administration** (NOAA), Boulder, CO, USA (02/21)
- *Vectorized operator evaluations for solutions of PDEs on heterogeneous architectures with libCEED*, Center for Applied Scientific Computing, **Lawrence Livermore National Laboratory** (LLNL), Livermore, CA, USA (01/24)

2019:

- *libCEED: a versatile, extensible high-order finite elements library for performance portability*, Applied Math Seminar, Department of Mathematics, **Colorado State University**, Fort Collins, CO, USA (10/02)
- *An efficient operator representation for High-Performance Computing*, Department of Mathematics and Applications R. Caccioppoli, **Università di Napoli Federico II**, Naples, Italy (07/08)
- *Efficient High-Order Operators and Library Reuse: libCEED* [slides], LANS Seminar, Mathematics and Computer Science Division, **Argonne National Laboratory** (ANL), Lemont, IL, USA (06/26)

2018:

- *Numerical investigation of thin viscoelastic films and membranes*, Postdoc Seminar, Department of Mathematics, **Colorado State University**, Fort Collins, CO, USA (10/22)

2017:

- *Simulations of viscous fluids on curved surfaces*, Fluid Mechanics and Waves Seminar, Department of Mathematical Sciences, NJIT, Newark, NJ, USA (01/30)

2016:

- *V. Barra, F. deGoes, T. DeRose, Simulations of fluids on surfaces*, Research Seminar, Pixar Animation Studios, Emeryville, CA, USA (12/13)

SELECTED CONTRIBUTED TALKS

2025:

- *Stabilization, Robustness and Accuracy of Numerical Simulations of Fluids From Thin Films to Global Scales*, The Third Joint **SIAM/CAIMS Annual Meetings** (AN25), Montréal, Québec, Canada (07/29)
- *How I (try to) engage students in the classroom*, Symposium for Women and Gender Minorities in Mathematics in Southern California (WiMSoCal), California State University, Fullerton, CA, USA (02/08)

2024:

- *Design and Interfaces for CliMA's Next-Generation Performance-Portable Earth System Model* [slides] [video recording], **Platform for Advanced Scientific Computing** (PASC), ETH Zurich, Zurich, Switzerland (06/05)

2022:

- *ClimaCore.jl: A New Flexible and User-Friendly Dynamical Core* [slides] [video recording], **Platform for Advanced Scientific Computing** (PASC), Basel, Switzerland (06/29)
- *Composability, Flexibility, and Ease of use for CliMA's Next Generation Earth System Model* [slides] [video recording], **SIAM Conference on Parallel Processing for Scientific Computing**, (PP22), (02/25, online)

2020:

- *Performance-portable interfaces for applications in Scientific Computing* [slides], **SIAM Annual Meeting**, (AN20), Toronto, Canada (07/14, online)
- *Towards Exascale Computing: Vectorized Operator Evaluations on Heterogeneous Architectures with libCEED* [slides] [video recording], **European Symposium on Computing** (ESCO20), (06/10, online)

2019:

- *libCEED: an open-source library for efficient high-order operator evaluations* [slides], **American Geophysical Union** (AGU19) Fall Meeting, San Francisco, CA, USA (12/10)
- *libCEED: lightweight high-order finite elements library*, Women in HPC workshop at **Supercomputing19**, Denver, CO, USA (11/17)
- *Efficient representation of high-order operators for the numerical solution of PDEs*, **1st Women in Mathematics Meeting** (WM²) in Portugal, FCT, Caparica, Portugal (07/22)
- *On performance portability and library reuse: A Navier-Stokes miniapp* [slides], **International Congress on Industrial and Applied Mathematics** (ICIAM19), Valencia, Spain (07/17)
- *Efficient solver composition with high-order methods* [slides] [video recording] **SIAM Conference on Computational Science and Engineering** (CSE19), Spokane, WA, USA (02/28)

2018:

- *Numerical simulations of thin viscoelastic films* [slides], **AMS Joint Mathematics Meeting** (JMM18), San Diego, CA (01/12)

2016:

- *Wetting and dewetting of thin viscoelastic drops* [slides], **SIAM Annual Meeting** (AN16), Boston, MA (07/15)
- *Interfacial dynamics of thin viscoelastic films and drops*, **The Fifth Annual Northeast Complex Fluids and Soft Matter Workshop**, NYU Tandon School of Engineering, New York, NY (01/15)

SELECTED RESEARCH POSTERS

2021:

- *Towards the CliMA Earth System Model: Composable operators for flexible discretizations* [poster], **American Geophysical Union** (AGU21) Fall Meeting, New Orleans, LA, USA (12/17)
- *LibCEED – The Finite Elements Library without Elements* [poster], **SIAM Conference on Computational Science and Engineering** (CSE21), Forth Worth, TX, USA (03/03, online)

2020:

- *Efficient implementations for matrix-free solutions of PDEs with libCEED* [poster], **American Geophysical Union** (AGU20) Fall Meeting, San Francisco, CA, USA, (12/15, online)

- *High-performance operator evaluations with ease of use: libCEED's Python interface*, **Scientific Computing with Python** (SciPy20), (07/07, online)

2019:

- *libCEED - lightweight high-order finite elements library with performance portability and extensibility* [poster], **Supercomputing19**, Denver, CO, USA (11/19)
- *Performance portability with matrix-free finite element operators*, **PETSc User Meeting 2019**, Georgia Tech, Atlanta, GA, USA (06/06)

2015:

- *Numerical study of thin layers of viscoelastic fluids*, **Scientista Symposium**, Microsoft, New York, NY, USA (10/18)
- *Numerical study of thin viscoelastic films on substrates*, **SIAM Conference on Computational Science and Engineering** (CSE15), Salt Lake City, UT, USA (03/15)

TEACHING EXPERIENCE

GRADUATE COURSES

- Spring 2026:
Course name: *Advanced Numerical Methods: Computational Partial Differential Equations*
Role: *Instructor of Record*
Department of Mathematics & Statistics, SDSU
- Fall 2025, Fall 2024:
Course name: *Methods for Computational Scientists*
Role: *Instructor of Record*
Computational Science Research Center, SDSU
- Spring 2025:
Course name: *Scientific Computing*
Role: *Instructor of Record*
Computational Science Research Center, SDSU
- Fall 2019:
Course name: *High-performance Scientific Computing*
Role: *Guest Lecturer*
Department of Computer Science, CU Boulder
- Spring 2018:
Course name: *Numerical Methods I*
Role: *Teaching Assistant*
Department of Mathematical Sciences, NJIT
- Fall 2015:
Course name: *Teaching in Mathematics*
Role: *Lab Instructor*
Department of Mathematical Sciences, NJIT

UNDERGRADUATE COURSES

- Fall 2017:
Course name: *Linear Algebra*
Role: *Instructor of Record*
Department of Mathematical Sciences, NJIT
- Spring 2017:
Course name: *NSF Capstone Laboratory*
Role: *Lab Instructor*
Department of Mathematical Sciences, NJIT

- Spring 2016, Spring 2015, Fall 2014:
Course name: *Applied Numerical Methods*
Role: *Lab Instructor*
Department of Mathematical Sciences, NJIT
- Spring 2014:
Course name: *Trigonometry and Principles of Differential Calculus*
Role: *Teaching Assistant / Recitation Instructor*
Department of Mathematical Sciences, NJIT
- Fall 2013:
Role: *Teaching Assistant / Recitation Instructor*
Course names: *Calculus C, Calculus II*
Department of Mathematical Sciences, NJIT
- Spring 2013, Fall 2012:
Course name: *Calculus II*
Role: *Teaching Assistant / Recitation Instructor*
Department of Mathematical Sciences, NJIT

WORKSHOPS AND TUTORIALS

- Spring 2022:
Workshops: *Software Engineering and Best Practices for Computational Scientists, ClimaCore.jl, Visualizations in Julia*
Role: *Creator, Organizer, and Instructor*
CLiMA, Caltech
- Fall 2019:
Tutorials: *LaTeX, MATLAB*
Role: *Creator, Organizer, and Instructor*
Postdoctoral Association of Colorado, CU Boulder

HIGH SCHOOL

- Summer 2013:
Course name: *Mathematics and Physics*
Role: *Teacher*
Tech High School "Ricasoli", Siena, Italy

Scientific Lyceum "Avocado", Siena, Italy

HONORS, GRANTS, AND AWARDS

- 04/10/26: **SDSU Grants Research and Enterprise Writing (GREW) fellowship, \$3000**

- 06/13/24: **NSF POSE: Phase I: An Open-Source Ecosystem for the Mimetic Operators Library Enhanced (MOLE)**
Total awarded: \$320,000
Role: Co-PI
- 06/05/24: **Association for Women in Mathematics Travel Award**, \$3500
- 10/02/22: Finalist for the **Italian Scientists and Scholars in North America Foundation (ISSNAF) Young Investigator Award 2022**, \$3000:
Finalists receive a travel award to attend the symposium and award ceremony during the ISSNAF Annual Event in November 2022, held at the Embassy of Italy in Washington DC.
- 02/08/21: **SIAM Early Career Travel Award**, \$400 for SIAM CSE21 online conference.
- 04/07/20: **Rising Stars in Computational and Data Sciences**:
Nominated and selected for the highly selective Rising Stars in Computational and Data Sciences Workshop, hosted at the **Oden Institute** of the **University of Texas at Austin** (online for pandemic).
- 06/16/19: **European Women in Mathematics Travel Award**, €400 for the First Women in Mathematics Meeting (WM²) in Portugal.
- 03/05/19: **SIAM Early Career Travel Award**, \$2500 for ICIAM19.
- 09/28/18: **SIAM Early Career Travel Award**, \$650 SIAM CSE19.
- 12/14/17: **Ahluwalia Doctoral Fellowship Award**, \$1000:
Nominated for the outstanding academic performance and excellent research in the PhD Program in the Department of Mathematical Sciences, NJIT.
- Spring 2015–Spring 2018: **Program for Excellence in Science of the American Association for the Advancement of Science**:
Nominated among deserving graduate students by the Vice Provost for Graduate Studies, NJIT.
- 10/30/14: **Best Research Poster Award**, Graduate Students Research Day 2014, NJIT.
- Fall 2011–Spring 2012: **University of Siena Mobility Fellowship**, \$50K:
Selected from over 80 candidates to receive full tuition, fees, and board for the exchange program at NJIT.
- 02/09/11: **Summa cum Laude Honor**:
Summa cum laude MSc honor degree in Mathematical Sciences, the University of Siena, 110/110 GPA.
- Fall 2005–Spring 2011: **University of Siena Full-ride Scholarship**, €18K:
Full-ride tuition, fee, and stipend for BSc (110/110 GPA) and MSc (110/110 GPA + laude) degrees in Mathematical Sciences, University of Siena.

RESEARCH AND ACADEMIC MENTORING EXPERIENCE

- **PhD Thesis Advising**:
 - Edward Finkelstein, Joint Doctoral Program in Computational Science, **San Diego State University** and **University of California Irvine** (Spring 2026 – present)
 - Yiyue Feng, Joint Doctoral Program in Computational Science, **San Diego State University** and **University of California Irvine** (Fall 2024 – present)
- **Master Student Advising**:
 - Prit Chakalasiya, MSc in Big Data Analytics, **San Diego State University** (Fall 2024 – Summer 2025)
- **Undergraduate Student Advising**:
 - James Cast, Weber Honors College Research Fellow, BSc in Computer Engineering, **San Diego State University** (Spring 2026)
 - Caelon Cragin, BSc in Mathematics, **San Diego State University** (Spring 2025)
- **Graduate Student Mathematical Modeling Camp**, University of Delaware, Newark, DE, USA (June 8–11, 2022)
Project title: *Cloudy with a Chance of Snow: The Life of a Snowflake in a Cloud Microphysics Model* ([Technical Report](#))
- **Graduate Student Mathematical Modeling Camp**, University of Delaware, Newark, DE, USA (June 9–12, 2021)
Project title: *Water flow through plants and its impact on climate* ([Technical Report](#))
- **Lead the Future**, a mentoring program for Italian students (Fall 2019 – present)
 - A. Y. 2025-2026:
 - Master student: Maria Elena Zuliani (Università di Udine and University of Klagenfurt, Austria)
 - A. Y. 2024-2025:

- Undergraduate student: Sofia Palermo (Polytechnic University of Milan)
- A. Y. 2022-2023:
 - Master students: Angelo Gnazzo (ETH Zurich), Antonino Emanuele Scurria (EPFL).
 - Undergraduate students: Edoardo Borso (UCL).
- A. Y. 2021-2022:
 - Master students: Lucjano Muhametaj (Imperial College).
 - Undergraduate students: Alessia Cirelli (University of Pavia), Benedetta Zamboni (Polytechnic University of Milan).
- A. Y. 2020-2021:
 - Master students: Arianna Ceccarelli (Imperial College), Francesco Brarda (University of Milan). Francesco Brarda was admitted to the PhD program in Mathematics at Emory University and Arianna Ceccarelli to the PhD program in Mathematics at University of Oxford under my mentorship.
 - Undergraduate students: Francesca Bettinelli (Polytechnic University of Milan).
- A. Y. 2019-2020:
 - Master students: Francesco Viganó (University of Milan and Université de Paris-Sud). Francesco Viganó was admitted to the PhD Program in Mathematics at LSGNT, a joint program of Imperial College, University College London, and King's College under my mentorship.
 - Undergraduate students: Giulia Mescolini (Polytechnic University of Milan), Maria Teresa Rotolo (University of Palermo), Maria Bevilacqua (University of Salerno).
- **Summer Program for Undergraduate Research, University of Colorado, Boulder, CO, USA** (Summer 2019)
Joseph Geisz (M. Sc./B. Sc. in Applied Math, University of Colorado Boulder)

PROFESSIONAL ACTIVITIES AND WORKSHOPS

- *NSF Innovation Corps Program (I-Corps) POSE Training* (07/15/24–08/09/24, online)
- *Argonne Training Program on Extreme-scale computing (ATPESC), ANL* (07/26–08/07/20, online)
- *Early Career Program, Supercomputing 19*, Denver, CO, USA (11/18/19)
- *Women in HPC Workshop, Supercomputing 19*, Denver, CO, USA (11/17/19)
- *CIRTL Evidence-Based Introduction to Teaching, University of Colorado*, Boulder, CO, USA (07/29–08/02/19)
- *Research&Writing Professional Development Certification, University of Colorado*, Boulder, CO, USA (04/02/19)

SERVICE

- Faculty sponsor for SDSU **Association for Women in Mathematics (AWM)** Student Chapter (01/2026-present)
- Reviewer and Program Committee member for the Computational Methods and Applied Mathematics of the **Platform for Advanced Scientific Computing 2026 (PASC26)** Conference (12/2025 – 04/2026)
- Podcast guest for **Generation STEM, IIS "Ciampini-Boccardo"** Novi Ligure, Italy (02/11/26)
- Speaker for **BEWISE HerSTEM Journey, Fleet Science Center**, San Diego, CA USA (02/04/26)
- Podcast guest for **Diversity in Science Lecture Series (DASL)** (08/13/25)
- Organizer and chair of the 8-talk session, entitled *Tacit Knowledge in Stable Compressible Flow Numerics* at the **Third Joint SIAM/CAIMS Annual Meetings (AN25)**, Montréal, Québec, Canada (07/28/25–08/01/25)
- Reviewer for the **Journal of Non-Newtonian Fluid Mechanics**, Elsevier (12/2019 – present)
- SDSU Department of Mathematics and Statistics and the Department of Computer Science new degree programs committee (Fall 2024 – Fall 2025)
- SDSU Department of Mathematics and Statistics Teaching Excellence Committee (Fall 2024)
- Reviewer and Program Committee member for the Computational Methods and Applied Mathematics of the **Platform for Advanced Scientific Computing 2025 (PASC25)** Conference (12/2024 – 04/2025)
- Poster judge for SDSU **Applied Computational Science and Engineering Student Success (ACSESS)** Annual Event 2024, San Diego, CA, USA (03/21/25)
- Reviewer for the **European Geosciences Union Geoscientific Model Development (GMD)** (07/2024)
- Panelist in the "Exploring Non-faculty Careers in Academia with CIRTL Alumni" panel, **CIRTL** (online, 04/17/24)
- Poster judge for SDSU **Applied Computational Science and Engineering Student Success (ACSESS)** Annual Event 2024, San Diego, CA, USA (03/22/24)

- SDSU **Computational Science Research Center (CSRC)** departmental website development (Spring 2024)
- Panelist for the US Department of Energy, **Office of Science, Advanced Scientific Computing Research (ASCR)** Software Sustainability funding review on Software Sustainability (\$125K) (01/2023)
- In-person Chair of the session entitled *Addressing Challenges for the Next Generation of Earth System Models* at the American Geophysical Union (**AGU Fall 2021 Meeting**, New Orleans, LA, USA (12/17/21)
- Poster and eLightning talk sessions *Outstanding Student Presentation Award (OSPA)* judge, **AGU Fall Meeting 21**, New Orleans, LA, USA (12/12/21–12/17/21)
- Reviewer for the **American Institute of Physics (AIP) Advances** (06/2020 – present)
- *Skype A Scientist*, volunteer scientist to talk to students from K-12 grades (Spring 2020 – present)
- Organizer and chair of the 13-talk session, with keynote speaker Jeffrey Hittinger, Director of the Center for Applied Scientific Computing (CASC) at Lawrence Livermore National Laboratory (LLNL), entitled *AMS Special Session on Recent Developments in Numerical Methods for PDEs* at the **AMS Joint Mathematics Meeting (JMM) 2020**, Denver, CO, USA (01/15/20–01/18/20)
- Poster judge for *MAA Undergraduate Student Poster Session*, **AMS JMM 2020**, Denver, CO, USA (01/17/20)
- *Postdoctoral Association of Colorado Boulder* workshop/tutorial series creator, organizer, and instructor, **University of Colorado**, Boulder, CO, USA (10/2019-09/2020)
- Poster and eLightning talk *Outstanding Student Presentation Award (OSPA)* judge, **AGU Fall Meeting 19**, San Francisco, CA, USA (12/09/19–12/13/19)
- Creator, organizer, and chair of the *Applied Math and Computer Science Postdoc Seminar*, **University of Colorado**, Boulder, CO, USA (11/2018-03/2019)
- Advisory board, **Postdoctoral Association of Colorado**, Boulder, CO (09/2019-09/2020)
- Poster session judge for the **Association for Women in Mathematics, SIAM CSE19**, Spokane, WA, USA (02/25/19-03/01/19)
- Poster session judge **Scientista Symposium, Microsoft**, New York, NY, USA (04/13-15/18)
- Poster session judge for the **AMS JMM 2018**, San Diego, CA, USA (01/12/18)
- Treasurer for the **SIAM Student Chapter and Mathematical Sciences PhD Club**, NJIT (09/2014-08/2016)
- Poster session judge, **Scientista Symposium, Microsoft**, New York, NY, USA (10/16-18/15)

PRESS COVERAGE

- *SDSU professor applies math to ketchup, cartoons, computers and climate modeling*, **San Diego State University News** (06/10/25)
- *Librerie matematiche per rendere i supercomputer più efficienti*, **Oggi Scienza** – English translation: *Mathematical libraries to make supercomputers more efficient* (11/02/20)
- *La scienza non è donna?* **The Post Internazionale** –English translation: *Isn't science female?* (10/06/18)
- *Finding Valeria: A Ph.D. Story*, **New Jersey Institute of Technology NEWS** (01/05/17)

PROFESSIONAL ORGANIZATIONS

Italian Scientists and Scholars in North America Foundation	(2020 – present)
Women in High-Performance Computing	(2019 – present)
US Research Software Engineering	(2019 – present)
European Women in Mathematics	(2019 – present)
American Geophysical Union	(2019 – 2022)
Association for Women in Science	(2019 – 2020)
American Association for the Advancement of Science / Science Program for Excellence in Science	(2016 – 2021)
Association for Computing Machinery	(2015 – 2019)
Association for Women in Mathematics	(2017 – 2020)
Society for Industrial and Applied Mathematics	(2014 – present)
American Physical Society	(2013 – 2015)

INDUSTRY EXPERIENCE AND INDUSTRIAL RESEARCH WORKSHOPS

- Fall 2016: **Pixar Animation Studios**, Emeryville, CA, USA

Job title: *Research Intern*

Developed a proprietary C++ library for a 2D Navier-Stokes solver for viscous fluid simulations on surfaces with arbitrary curvature. Expanded existing code to include different types of discretized domains (from triangular to polygonal meshes). Included user-defined solid obstacle and boundary conditions for open meshes. Prototyped the development of a plug-in for third-party procedural 3D animation and special effects software for film and entertainment, Houdini by SideFX. Developed a proprietary C++ library to simulate the dynamics and interface instabilities of 3D thin viscous films on triangulated surfaces with arbitrary curvature.

- Spring 2011: **Tecnoprogram Srl**, Siena, Italy

Job title: *Algorithm Analyst and Developer*

Developed software for CAD/CAM systems. Analyzed geometry processing algorithms for applications in the fields of Computer Graphics, Numerically Controlled Machines and industrial robots, such as construction and modelling of NURBS surfaces, mesh triangulations, object trimming and surface reconstruction. Used geometric processing tools and libraries for large geometric databases, such as OpenMesh, and improved the performance of existing proprietary software.

- 06/17-21/19: Mathematical Problems in Industry, **NJIT**

For **Under Armour**

Project title: *Analyzing Viscoelastic Materials*

- 06/25-29/18: Mathematical Problems in Industry, **Claremont Graduate University**

For **NASA Jet Propulsion Laboratory**

Project title: *The problem of freezing of copper water heat pipes* [Technical Report]

- 06/19-23/17: Mathematical Problems in Industry, **NJIT**

For **Revon Systems, Incorporated**

Project title: *Predicting exacerbation and associated triage in COPD patients* [Executive Summary]

- 06/13-17/16: Mathematical Problems in Industry, **Duke University**

For **CoVar Applied Technologies**

Project title: *Scoring practices for remote sensing* [Technical Report]

- 06/22-26/15: Mathematical Problems in Industry, **University of Delaware**

For **Corning, Incorporated**

Project title: *Frozen shapes: thin nearly flat elastic shells with stretching and bending* [Technical Report]

- 06/23-27/14: Mathematical Problems in Industry, **NJIT**

For **W.L. Gore & Associates**

Project title: *Characterization of porous media using a geometric depiction of fibrous materials* [Executive Summary]