Applied Math Ph.D Program@Columbia - Overview

- A nationally-ranked program (NRC ranking, US News ranking).

- 9 (regular faculty) + 2 (term faculty) + 2 (affiliated) + 1 (lecturer) + 1 (Emeritus).

- Other affiliated faculty@Columbia: IEOR, NASA/GISS/Lamont, Math, CS, EE, .... Recent Ph.D students have worked with faculty@CS/CEEM/IEOR.

- Cross-cutting/interdisciplinary: joint affiliations, working with materials science, applied physics, ...

- Research: from climate and storms to earth mantle, from optics to photonics, from x-ray and microscopy to photoacoustics imaging, from deep learning to autonomous driving, ...

- Funding: NSF (DMS, DMR, OAC, CISE, GRFP), AFOSR, ARO, ONR, DARPA, Simons, NOAA, ....

- Outstanding alumni at: Carnegie Mellon, Texas, UCSD, Stony Brook, ..., Financial/Tech Firms.

- Brilliant students: e.g., NSF GRFP (Rachael Keller, Kathy Li, Jessica Oehrlein, Edith Zhang).
Applied Math: Faculty excellence in research and mentoring

▶ Awards and honors:

- **Adam Sobel** (Louis J. Battan Award from American Meteorological Society);
- **Lorenzo Polvani** (Fellow of the American Meteorological Society);
- **Kui Ren** (Calderon Prize in inverse problems, 2017);
- **Michael Weinstein** (SIAM Kuskal Prize, Fellow of SIAM\(^1\) and AMS\(^2\));
- **Qiang Du** (Fellow of SIAM\(^1\), AMS\(^2\) and AAAS\(^3\), ICM invited speaker ...)

...  

▶ Initiatives/Leaderships:

- **Sobel**: leading new Columbia Initiative on Extreme Weather & Climate.
- **Du**: SEAS Initiative on Computational Science & Engineering.
- **Du**: co-Chair, Center for Comp Sys and Data-driven Science.
- **Du**: past chair of SIAM Activity Group on Math of Materials Science
- **Weinstein**: Simons Math+X investigator, NSF-IMA special year on math & optics.
- **Ren**: organizer of NSF-ICERM special program on inverse problems.
- **Wiggins**: chief data scientist at New York Times.

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\(^1\) **SIAM**: Society of Industrial & Applied Mathematics

\(^2\) **AMS**: American Mathematical Society

\(^3\) **AAAS**: American Association for the Advancement of Science
Applied Math - Brilliant students

James Lee Thorp: PhD 16, postdoc@Courant, papers in PNAS/CPAM, Simon memorial prize;
Xiaochuan Tian: PhD 17, Intern@PNNL/ORNL, visitor@Hausdorff & Max Planck Inst., RHBing Instructor@UT-Austin. 2016 SIAM Outstanding paper prize, 2020 SIAM Rev SIGEST award

work is “first-rate”, "having impact in mathematics (applied & fundamental) & applied physics", "a model of the kinds of deep & cross-disciplinary work that our department strives to promote".
- by Weinstein, advisor

"dissertation has produced novel mathematical results that have had significant practical impact”,
- 2018 AWM best PhD dissertation award citation
(Association of Women Mathematicians)
Applied Math: Faculty/student teaming up together

- **NSF-RTG (Research Training Grant) $1.9million for 5 years.** PI: Ren (APAM); Co-PI: Weinstein/Du (APAM), De Silva/Corwin (MATH), with other participating APAM/DSI/STAT faculty members; to create a model program in applied math research training in the nation.

- **Collaborative/interdisciplinary:** faculty with joint appointments/affiliations (Wiggins: System biology/DSI, Sobel/Polvani/Spiegleman: Lamont and Earth & Environmental Sciences; Du/Mandli/Ren/Tippet: DSI, Weinstein: MATH).

- **Joint advisors:**
  - Braxton Osting (faculty at Utah) supervised by Weinstein & Keyes;
  - Gideon Simpson (faculty at Temple), supervised by Weinstein & Spiegleman;
  - Philip Dinensis (APAM, current), supervised by Mandli & Bienstock;
  - Wen Ding (APAM, current), supervised by Du & Ren.

- **Data Science Institute (DSI):** Major SEAS/Columbia initiative, Applied Math Ph.D can elect a specialization in Data Science (consult Qiang Du, for details)