

# **Division of Mathematical Sciences (DMS)**

## **Virtual Office Hour**

### **Date: August 19, 2021**

Welcome to the DMS Virtual Office Hour. We will begin soon.

Please submit questions via the Q&A box  
available to you on Zoom.



# Division of Mathematical Sciences (DMS)

## Welcome to our Virtual Office Hours!

Program Directors in attendance today

- Juan C. Meza (Division Director)
- James Matt Douglas, Michelle Manes, Andrew Pollington, Sandy Spiroff (ANT)
- Yong Zeng, Malgo Peszynska, Andrew Pollington, Edsel Pena, Gabor Szekely (CDS&E-MSS)
- James Matt Douglass (NSF Includes)
- Andrew Pollington (SaTC Frontiers)
- Conni Liaw (“How to write compelling proposals”)
- Moderators: Malgo Peszynska, Conni Liaw, Chris Stark, James Matt Douglass, Swatee Naik

### Subscribe to DMSNEWS:

Send email to [listserv@listserv.nsf.gov](mailto:listserv@listserv.nsf.gov)  
In the body of the message, put the following command:  
subscribe dmsnews [your name]

### Suggest a topic for future VOH:

Send email to [dms-voh@nsf.gov](mailto:dms-voh@nsf.gov)



# Division of Mathematical Sciences (DMS)

## Questions during VOH:

- Submit your questions via the Q&A box
  - Questions can be submitted anonymously.
  - We will focus on questions of interest to a wide audience.
  - For specific questions about a particular project, contact a cognizant Program Officer.
- For recently asked questions/copy of slides, see <https://www.nsf.gov/mps/dms/presentations.jsp>
- Next DMS Virtual Office Hour: Thursday, Sept. 16, 3:30PM EDT
  - Topics include: the Topology and Geometric Analysis and Applied Math programs, Mathematical Sciences Postdoctoral Research Fellowships (MSPRF), Graduate Research Fellowships (GRFP).
  - Questions can be submitted in advance on the registration form.



# Division of Mathematical Sciences (DMS)

## Virtual Office Hour Topics today:

- Update from the Division Director
- Algebra and Number Theory [https://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=5431](https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5431)
- Computational and Data-Enabled Science and Engineering in Mathematical and Statistical Sciences (CDS&E-MSS). [https://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=504687](https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504687)
- NSF Includes [https://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=505289](https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505289)
- Secure and Trustworthy Cyberspace  
[https://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=504709](https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504709)
- “How to write compelling proposals”
- Q&A



# Division of Mathematical Sciences (DMS)

## Opportunities and upcoming deadlines:

- Funding opportunities  
<https://www.nsf.gov/funding/programs.jsp?org=DMS>
- Upcoming deadlines link  
[https://www.nsf.gov/funding/pgm\\_list.jsp?ord=date&org=NSF&sel\\_org=DMS&status=1](https://www.nsf.gov/funding/pgm_list.jsp?ord=date&org=NSF&sel_org=DMS&status=1)
- Upcoming due dates: all in 2021
  - REU: August 25
  - Mathematical Biology: September 6
  - NRT: September 6
  - SaTC Frontiers Letter of Intent: September 7
  - FRG (Focused Research Groups in the Mathematical Sciences): September 8
  - CDS&E-MSS: September 15
  - DMS/NIGMS: September 20
  - Probability: September 27; Combinatorics and Foundations: September 28
  - Analysis: September 30
  - Algebra and Number Theory: October 8



# DMS Division Director Update

## August 19, 2021

- Staff Updates
- AMS Travel-Grant Support
- NSF-Simons National Institute for Theory and Mathematics in Biology



# Algebra & Number Theory Program (ANT) Overview

- **Website:**

[https://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=5431&org=DMS&from=home](https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5431&org=DMS&from=home)

- **Program Officers for DMS:**

James Matt Douglass ([mdouglas@nsf.gov](mailto:mdouglas@nsf.gov))

Michelle Manes ([mmanes@nsf.gov](mailto:mmanes@nsf.gov))

Andrew Pollington ([adpollin@nsf.gov](mailto:adpollin@nsf.gov))

Sandra Spiroff ([sspiroff@nsf.gov](mailto:sspiroff@nsf.gov))

- **Submission Deadline:** *Target Date* October 8, 2021 (PD 20-1264)



# Algebra & Number Theory Program (ANT)

## Important Points

- The Algebra and Number Theory program supports research in all areas of algebra, algebraic and arithmetic geometry, number theory, representation theory, etc.
- The program solicitation "Conferences and Workshops in the Mathematical Sciences" (NSF 20-541) contains important information regarding the substance of proposals for conferences, workshops, summer/winter schools, and similar activities. Currently, because of COVID, proposals for meetings with budget requests not exceeding \$50,000 should be submitted at least four months in advance of the event. Check the program webpage or contact a program director for updates.

NOTE: Each program has its own submission schedule for conference and workshop proposals.

- A revised version of the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 22-1), is effective for proposals submitted, or due, on or after October 4, 2021.





# Computational and Data-Enabled Science and Engineering in Mathematical and Statistical Sciences (CDS&E-MSS)

- **Website:**

[https://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=504687&org=NSF](https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504687&org=NSF)

- **Program Officers for DMS:**

Yong Zeng	( <a href="mailto:yzeng@nsf.gov">yzeng@nsf.gov</a> )
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Edsel Pena	( <a href="mailto:epena@nsf.gov">epena@nsf.gov</a> )
Gabor Szekely	( <a href="mailto:gszekely@nsf.gov">gszekely@nsf.gov</a> )

- **Solicitation NSF 20-8069**

**Submission Window:** September 1 – September 15, 2021



# Synopsis of CDS&E-MSS Solicitation

- The program accepts proposals that engage with the mathematical and statistical **challenges** presented by
  - A. the ever-expanding role of **computational experimentation, modeling, and simulation**
  - B. the explosion in production and analysis of digital **data from experimental and observational sources**
- The **goal** of the program is to promote
  - A. the **creation and development** of the next generation of mathematical and statistical **software tools**
  - B. **the theory** underpinning those tools, that will be **essential for addressing these challenges**.
- The research supported by the program will **aim to advance mathematics or statistics in a significant way** and will **address computational or big-data challenges**.



# Important Factors in CDS&E-MSS; related programs

- Important factors:
  1. Involves one or more **challenges** involving **computation** or **data**
  2. Addresses the creation and development of **software tools** (including database; especially, software designed to develop tools for mathematical research)
  3. Involves the **theory** that will be **essential for addressing these challenges** and **advance mathematics or statistics in a significant way**
  4. Project **MUST INCLUDE** a PI or co-PI who is a researcher in an area supported by DMS
  5. Program **WELCOMES** submissions that involve **multidisciplinary collaborations** and/or provide **opportunities for training** through research involvement of junior DMS researchers
- For topics covered by the Program, see “**What Has Been Funded**” on the website
- CDS&E-MSS is a part of foundation-wise [CDS&E Program](#). See also [Cyberinfrastructure for Sustained Scientific Innovation \(CSSI\)](#) program devoted to implementing existing methods into robust cyberinfrastructure.



# NSF INCLUDES

**NSF INCLUDES** is an NSF-wide initiative to broaden participation in STEM:

“**NSF INCLUDES** seeks to improve **collaborative efforts** aimed at enhancing the preparation, increasing the participation, and ensuring the contributions of individuals from groups that have been historically underrepresented and underserved in the STEM enterprise.”

- The **NSF INCLUDES** National Network: Get involved at <https://www.includesnetwork.org/>
- On-ramps and other start-up and “small-scale” funding opportunities (when available): [https://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=505289](https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505289)
- Alliances (NSF 20-569), letter of intent October 4, 2021; full proposal January 25, 2022



# Secure and Trustworthy Cyberspace (SaTC)

**Website:** [https://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=504709](https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504709)

**Lead: CISE Jeremy Epstein**

**Program Officer in DMS: Andrew Pollington**

**Proposal Window:**

**Small (up to \$600k) Medium (\$600k to \$1.2M) Anytime to Sep 30 2022**

- An across NSF flagship program in security with a budget of around \$69M
- SaTC encompasses 5 NSF directorates and is administered by CNS in CISE. Solicitation [21-500](#)
- DMS is involved through work currently in cryptography, Statistics, Probability and QIS. A recent concentration is in post quantum crypto schemes and the NIST competition.
- **Frontier NSF 21-597 (Up to \$10M over five years); Letter of Intent** required (due September 7); full proposal deadline November 17, 2021.



# What Makes a Good SaTC Frontier Proposal?

- A coherent project addressing an important topic in the field
- Whole more than the sum of the parts
  - Coherent integration among the research teams and institutions
  - Interdisciplinary is desirable but not required
  - Projects must be comprehensive and well-integrated, and should make a convincing case that the collaborative contributions of the project team will be greater than the sum of each of their individual contributions
- Project requires large coordinated efforts



# Division of Mathematical Sciences (DMS)

## Writing compelling proposals: Do this!

- Read & follow PAPPG & solicitation
- Start early / proofread carefully (also the submitted files)
- Put your research into context
- Do the background work
- Be specific:
  - “Question”
  - “Conjecture” or “Target Theorem”
  - What tools & approaches you’ll use
  - [Broader impact examples](#)
- Be ambitious but realistic
- Write for the reviewers:
  - Experts in your general field
  - Reading **a lot** of proposals
- Get help / mentorship
- Clearly delineate work done from proposed work
- Read reviews & other feedback
- Clear motivation:
  - Why this research now?
  - Why you?



# Division of Mathematical Sciences (DMS)

## Writing compelling proposals: Don't do that!

- Be vague:
  - “Investigate”
  - “Explore”
  - “Study”
- Write research paper or laundry list
- Dive into technicalities
- Fake it / lip service:
  - “potential applications to cryptography”
  - “mentor students from under-represented groups”
- Just do the next obvious step
- Neglect broader impacts
- Misunderstand broader impacts
  - Not just “potential applications to other areas of math or science”
  - Not everyday duties of faculty
  - Not “collaborating with women”

**Most of all, don't give up!**





# Virtual Office Hour: Questions from registration

1. General questions:
  - A. Are collaborative projects from different research universities encouraged?
  - B. Can a faculty member serve as a PI on two proposals (e.g., to CDS&E-MSS and later to Statistics)
  - C. Are there opportunities to support innovative approaches to the teaching of the introductory statistics course?
  - D. Can we include foreigners as investigators? (Without support? With support for travel and/or software? Is support for salary allowed?)
  - E. What is “transformative” research?
  - F. I would like to know what are the new features for applying a regular NSF grant this year.
2. ANT program
  - A. I have questions regarding the conference proposals in the ANT.
  - B. Is the ANT program involved in reviewing proposals on algebraic combinatorics?
3. CDS&E-MSS program
  - A. How the CDS&E-MSS program differs from the 'traditional' statistical science part of DMS?
  - B. Is CDS&E-MSS an appropriate program for machine learning methods for physical science data?
  - C. What is the difference between the CDS&E-MSS program and the multi-division CDS&E solicitation?
  - D. What is the typical duration and budget of a project? How should the budget be structured?
4. SaTC Frontiers:
  - A. Are mathematics/statistics investigators substantially involved in the past SaTC awards?



# Division of Mathematical Sciences (DMS)

## Virtual Office Hour: Thank you

- For slides and recently asked questions, see <https://www.nsf.gov/mps/dms/presentations.jsp>
- Submit questions/suggestions to [DMS-VOH@nsf.gov](mailto:DMS-VOH@nsf.gov)
- Submit questions through event registration form
- For specific questions about your project, contact a Program Officer
- For future Virtual Office Hour topics, see [https://www.nsf.gov/events/index.jsp?org=NSF&event\\_type=12&orgToSearch=MPS&month=&year=2021](https://www.nsf.gov/events/index.jsp?org=NSF&event_type=12&orgToSearch=MPS&month=&year=2021)
- Next DMS VOH: Thursday September 16, 3:30 PM EDT
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