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AMS NEWSLETTER FEBRUARY 12th, 2024

AMS WEEKLY SCHEDULE

Monday, February 12th:

- Methane Research Meeting, **CH 156 - 12:00 PM to 2:00 PM**
- AMS Tea Time, **CH 156 - 3:00 PM to 4:00 PM**
- CWP Seminar, **AH 140 - 4:00 PM to 5:00 PM**

Tuesday, February 13th:

- SWiM Social Event, **CH 143 - 5:00 PM to 6:00 PM**

Wednesday, February 14th:

- Hydrology Research Meeting, **CH 156 - 12:00 PM to 1:00 PM**
- Methane Research Meeting, **CH 156 - 1:00 PM to 3:00 PM**

Thursday, February 15th:

- Optimization Research Meeting, **SH 110 - 10:45 AM to 12:00 PM**

Friday, February 16th:

- Graduate Student Colloquium w/ Brandon Knutson, **CH 143 - 3:00 PM to 4:00 PM**

ADVISING CORNER

Advising Information

Graduating Seniors: **See this site** for all things Commencement.

For students in the Combined BS/MS programs (formerly 4+1 programs):

Please ensure classes you are taking for your MS are on your graduate transcript rather than your undergrad transcript. If you are double counting courses for your BS, they can remain on your undergraduate transcript.

The new deadline to request this change is Friday April 12, the last day to withdraw from classes.

*If you have any questions, email Paula Prentice at **paula.prentice@mines.edu**, email **registrar@mines.edu**, or set up an appointment **here**.*

AMS Academic Advising Office Hours

Office hours with Paula Prentice, your academic advisor, are held weekly on Thursdays in CH 147 from 2:30PM-3:30PM.

Update on office hour procedures: There will be a list on the door where you can sign up when you arrive. To best serve each student, we will meet individually for a maximum of 15 min on a first come first serve basis. If you would like to have more time with your advisor, make an appointment **here**. Appointments through this link are 25 minutes unless you schedule two in a row.

Questions About Graduate School?

Are you wondering about the combined BS/MS program? Reach out to the Office of Graduate Students at **grad.services@mines.edu** to get the most up-to-date information. If you have questions about AMS graduate courses, reach out to Lisa Maddux (**lmaddux@mines.edu**).

AMS DEPARTMENT ACKNOWLEDGEMENTS

Dr. Nathan Lenssen Featured by the Mines Newsroom and in Yale Climate Connections Article

Congratulations to Dr. Nathan Lenssen for his feature in the **Mines Newsroom** and Yale Climate Connections' article '**Will La Niña return this fall? The tea leaves are unusually strong**'!
Lenssen led a paper that used weather data to create “hindcasts” (forecasts of replicated past events) to analyze predictability when a strong El Niño–Southern Oscillation is in progress.

ANNOUNCEMENTS & EVENTS

Scholarship for Hispanic/Latinx Mathematics Students

The 2024 Lathisms Scholarship scholarship intends to support Hispanic/Latinx students interested in pursuing a career focused in the mathematical sciences; such career paths include, but are not limited to, scientific research, mathematics education, engineering, and finance.

The Lathisms Scholarship Team will be awarding scholarships of up to $500 (each), aimed at prospective and current undergraduate/graduate students. The deadline is **February 29th**.

Full scholarship details, along with the application, can be found **here**.

Office of Nationally Competitive Scholarships Open House

Join the Office of Nationally Competitive Scholarships at our open house event to learn about how we support undergraduate students, graduate students, and alumni in applying to a variety of nationally competitive awards! We will have hot chocolate and cookies, activities, and good company. Mingle with scholarship recipients, interested students, staff, and faculty, grab a bite, and enjoy learning more about our opportunities. Nationally Competitive Scholarships is a program of University Honors & Scholars (UHS).

AMS Tea Time

Please join us every Monday in Chauvenet 156 from 3:00 to 4:00 for our weekly AMS Tea Time!

This is a great opportunity to meet fellow AMS undergraduate and graduate students, chat with professors and advisors, and enjoy a break in the day!

This week's colloquium is a graduate student colloquium on **February 16th at 3:00 PM in CH 145** with **Brandon Knutson**!

For this semester's Colloquium schedule, **click here**!

CONFERENCES & SEMINARS

CWP Seminar (February 12th)

Today's (2/12) CWP Seminar has two speakers:

Speaker: Daniel
Title: On Ruikun Cao's 2020 Paper Entitled: Near-real-time near-surface 3D seismic velocity and uncertainty models by wavefield gradiometry and neural network inversion of ambient seismic noise.
Abstract: With the advent of large and dense seismic arrays, novel, cheap, and fast imaging and inversion methods are needed to exploit the information captured by stations in close proximity to each other and produce results in near real time. Ruikun Cao and his team at the University of Edinburgh have developed a sequence of fast seismic acquisition for dispersion curve extraction and inversion for 3D seismic models, based on wavefield gradiometry, wave equation inversion, and machine-learning technology. The seismic array method that they use is Helmholtz wave equation inversion using measured wavefield gradients, and the dispersion curve inversions are based on a mixture of density neural networks (NNs). For their approach, they assume that a single surface wave mode dominates the data. They derive a nonlinear relationship among the unknown true seismic wave velocities, the measured seismic wave velocities, the interstation spacing, and the noise level in the signal. First with synthetic and then with the field data, they find that this relationship can be solved for unknown true seismic wave velocities using fixed point iterations. To estimate the noise level in the data, they need to assume that the effect of noise varies weakly with the frequency and they need to be able to calibrate the retrieved average dispersion curves with an alternate method (e.g., frequency wavenumber analysis). The method is otherwise self-contained and produces phase velocity estimates with tens of minutes of noise recordings. They use NNs, specifically a mixture density network, to approximate the nonlinear mapping between dispersion curves and their underlying 1D velocity profiles. The networks turn the retrieved dispersion model into a 3D seismic velocity model in a matter of seconds. This opens the prospect of near-real-time near-surface seismic velocity estimation using dense (and potentially rolling) arrays and only ambient seismic energy.

Speaker: Adesh
Title: Ambient seismic modelling for an elastic-acoustic coupled model.
Abstract: We have seen ambient wavefield information from Gulf of Mexico recorded on the seafloor including the types, frequency and effective source distribution of recorded surface-wave modes, the near-seafloor elastic model structure, and the sensitivity of recorded wave modes to model structure in Aaron's presentation before. This talk will outline the ambient seismic modelling engine for a coupled acoustic-elastic system and present some of the modelling cases to explain the wave modes that we see in GOM dataset.

Math For All in Boulder 2024

Math For All in Boulder has the purpose of fostering inclusivity in mathematics by holding talks and discussions in both research and education. This conference will be tailored to undergraduate and graduate students, post-docs, and faculty members from all institutions in the Front Range area

INTERNSHIPS, JOBS, & RESEARCH

Funded Undergrad Math/Stats Bootcamp (Summer 2024, Chicago)

Dear AMS Majors,

The Institute for Mathematical and Statistical Innovation (IMSI) is an NSF-funded institute in Chicago managed by U Chicago, Northwestern, UIC, and UI Urbana-Champaign. They are hosting a funded, 8-week math and stats boot camp aimed a students who are considering graduate studies in mathematical science.

The program pays for travel, lodging near UChicago, as well as a stipend.

Applications are due **February 16, 2024**.

This could be a neat opportunity if you are trying to determine if graduate school is the right path for you, or trying to beef up your resume for grad apps!

Reach out if you have questions,

- **Dr. Lenssen**

Quantum Engineering Fellowship

The **application** for the Fall 2024 Quantum Engineering NRT Fellowship is now open and submissions are due by EOD **February 15**.

One-year competitive fellowships that provide funding (tuition, fees, medical insurance, and $36K stipend) are available to qualified domestic (U.S. citizens, nationals, and permanent residents) students.

- Applicant must be a U.S. citizen, national, or permanent resident to be stipend-supported.
- Applicant must be pursuing/currently applying for enrollment in a graduate program at Mines.
- Applicant must intend to work on a collaborative research project (defined as having 2 or more PIs).
- The research project must be in quantum information or adjacent area.
- Applicant must have a GPA of at least 3.0 if at an institution that grades based on a 4.0 GPA scale.

To learn more and to apply, please see the attached documents and visit the Fellowship **website**.

If you have any questions, please talk to your advisor/s and do not hesitate to reach out to me, **kbachman@mines.edu**.

Summer 2024 DRUMS (REU)

The Mathematics and Statistics Departments of North Carolina State University invite qualified applicants for a Research Experiences for Undergraduates (REU) program that pairs mathematics and statistics students for interdisciplinary summer research projects. Proposed projects span applications in disease modeling, deep learning, image segmentation, cell structure modeling, and clinical trials; using tools from linear algebra, partial differential equations, probability, sensitivity analysis, parameter inference, optimization, and machine learning. In addition to the technical aspects of the program, students also learn auxiliary skills including mathematical programming, technical writing, applying for graduate school, and preparing scientific presentations.
For the DRUMS program, 20 students will work at NCSU for 10 weeks during the 2024 summer and the fall semester. Formal summer activities will be from May 28th – Aug 2nd. The work during the fall semester will be conducted online. The time commitment for this part of the program will be approximately 5 hours per week including a 1h weekly remote meeting.

studies. Students will need to submit a curriculum vitae/resume, a transcript (unofficial is fine), and two reference letters. In addition, students should submit a one-page personal statement. One letter should list a local faculty member who is willing to serve as a mentor for the fall semester. The personal statement should include the reason(s) why you wish to participate in the DRUMS REU at NCSU. Due to restrictions from NSF and NSA, our program is restricted to US citizens and permanent residents, and participants must be undergraduate students at the time of participation. Students will receive a stipend in the amount of $7,000 for the 10 weeks, housing, and travel support up to $600 per student to cover transport to and from NCSU.
Application Deadline: The review of applications begins **February 15** and will continue until all slots are filled.

Please apply at **mathprograms**.

Contact Information for **DRUMS REU:**
Mette Olufsen (Professor of Mathematics, North Carolina State University)
Brian Reich (Distinguished Professor of Statistics, North Carolina State University)

AI Research Internships for Undergraduates

This summer, Johns Hopkins University's Center for Language and Speech Processing is hosting the Tenth Frederick Jelinek Memorial Summer Workshop and is seeking **outstanding rising seniors at U.S. universities** to participate in this eight-week human language technologies (HLT) workshop.

This highly-selective residential program, which will be held on JHU's Homewood campus in Baltimore from **June 10 to August 2,** includes:

- A comprehensive two-week summer school on HLT
- A six-week intensive project-based research experience

The workshop is an intense, dynamic intellectual environment and undergraduates will work alongside senior researchers as part of a multi-university research team that will focus on an HLT problem of current interest. Many of our past undergraduate participants have gone on to pursue graduate studies in HLT and AI.

Teams/topics under consideration this year include:

- AI-curated democratic discourse
- Sign LLM, large sign language model
- Evaluating LLM performance in research astronomy
- Multimodal multi-task audio-visual transformer

Participating undergraduates will receive:

- The opportunity to explore an exciting new area of research
- A two-week tutorial on current speech and language technology
- Mentoring by experienced researchers
- Participation in project planning activities
- Use of cloud computing services
- A $6,000 stipend and $2,800 towards meals and incidental expenses
- Furnished accommodation for the duration of the workshop
- Travel expenses to and from the workshop venue

Application process

March 4

2. Submit applicant CV here: Friday, March 8
3. Faculty nominator to submit recommendation letter here: Friday, March 15

Apply now

Questions should be directed to the JSALT 2024 organizing committee.

Applicants will be evaluated based solely on relevant skills, employment experience, past academic record, and the strength of letters of recommendation.

Students in any major may apply.

Students from underrepresented backgrounds are strongly encouraged to apply, as are those from academic institutions with limited research opportunities in STEM.

Submit your events, announcements, and opportunies for the AMS Newsletter to amsoffice@mines.edu!

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