Undergraduate Research in Mathematics and Statistics

Presented by
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What is student research?

- Collaborate with a mentor (professor or supervisor) on a research project to solve a mathematical/statistical problem of interest to the academic community or motivated by industry.
- Devote a certain number of hours/week to work on the project and meet regularly with their mentor.
- Different types of problems: theoretical, applied (industry), computational (programming)
- Different opportunities: internal/external to Rowan, paid/unpaid, internships, REUs.

Why do research as an Undergrad?

- Educational Benefits
- Professional Benefits
- Personal Benefits

Educational Benefits

- Experience firsthand what research is
- Enhance understanding and knowledge of your academic field.
- Apply what you learn in class to real-world projects.
- Learn new things that aren't covered in classes
- Earn academic credit
- Prepare for graduate study
- Improve/Acquire Skills:
  - communication (written and oral)
  - critical thinking
  - problem-solving
  - teamwork
  - time management

Professional Benefits

- Explore your interests and clarify your career goals
- Gain academic credentials to build up your resume
- Find a mentor
- Develop strong relationships with faculty (think recommendation letters!!!).
- Network with experts in your field (Future employers).
- Check out potential graduate school programs/Build liaisons (Off Campus)

Personal Benefits

- Build confidence in your skills.
- Sharpen your critical and analytical thinking skills
- Meet new people with common goals and interests
- Travel to a new place (Off Campus research or Conference presentation)
- Earn scholarships, stipends, and/or awards for having conducted research.
- Confront a fear/learn something new
- Life changing experience

Before getting involved consider

- What do you hope to gain from research experience?
- What are your interests?
- What do you know about research in your field?
- How much time can you realistically commit to working on a research project?
  - Consider summer programs
- Are there particular skills you need to aid you in your research project?
- Are there courses you should take before doing a particular research project?
- What type of learning environment do you prefer?

Selecting a Mentor

- What do you expect from a research mentor?
- What are your scholarly interests and career goals?
- Which faculty shares your interests?
- Who do you enjoy working with?
- What is your preferred research environment?
- What type of training do you want?
- What skills do you want to develop?

Where do I find one?

- On Campus:
  - Paid or Unpaid options
  - Semester long or Summer (5 or 10 weeks available)
  - Talk to your professors
  - Go to departmental colloquium to get an idea

- Off campus
  - Usually over summer
  - Search internet (Key words: Summer undergrad research/internships)
  - Check out Local Businesses (Large companies: Banks, Pharmaceuticals, etc.)
  - National Science Foundation REU program: https://www.nsf.gov/crssprgm/reu/

How do you get one?

- Plan in advance (Off campus deadlines from early Dec – April)
- Take courses that will help you be a strong candidate (consider Math 01.390 – Mathematical Research)
- Pick a variety of programs including what might look to be ones that aren't as "exciting"
- Talk with your faculty advisor about the application
- Don't underestimate yourself
- Apply on time with a complete application
- Apply! Apply! Apply!

Applications

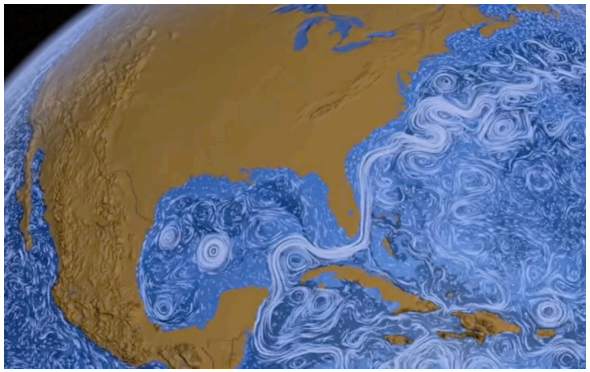
- List of relevant coursework or transcripts
- Letter(s) of Recommendation
  - Don't wait until the last minute
  - Try to give all at once with link to program, addresses and deadlines
- Personal Statement (important)
- Resume (write a good one – get help)
- Ask for a second opinion from advisor

Start Now!

- Provide your email address in the chat box to be contacted by a Math professor for opportunities
- Be involved with the Math Team (more discussions about student research)

Dr. Helga Huntley

- Research Interests:
  - Geophysical fluid dynamics.
  - Ocean, atmosphere, climate modeling.
  - State estimation and predictability.
- Potential Projects:
  - Extract flow properties from observed trajectories of drifters.
  - Large vortex spin-off in the Gulf of Mexico.
  - Image analysis of photos of floating objects.



- Time frame: Summer 2021 and thereafter
- Funding possible
- Student Skills required:
  - Curiosity about the ocean.
  - Programming skills in Matlab.
  - Multivariable calculus; differential equations a plus. (Precalculus only for image analysis)
- Contact Info:
  - huntleyh@rowan.edu.

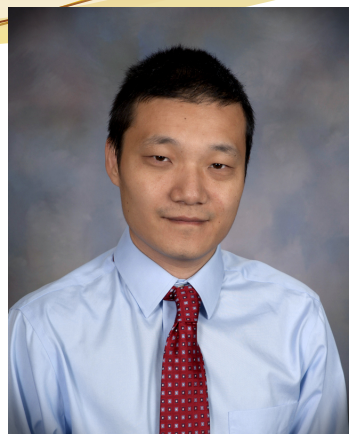
Dr. Hieu Nguyen

- Research Interests:
  - Coding Theory, Machine Learning
- Potential Projects:
  - Error-correcting codes: decoding algorithms for insertion/deletion errors
  - Distributed machine learning using error-correcting output codes
  - Image segmentation using deep learning
- Looking for up to 2 students
- Funding: potentially available Fall 2021
- Time frame: Starting spring 2021 semester
- Student Skills required:
  - Discrete math
  - Strong computer programming skills
- Contact Info:
  - nguyen@rowan.edu, Robinson 228N

Dr. Thanh Nguyen

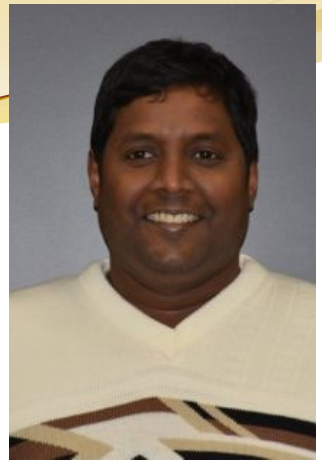
- Research Interests:
  - Ordinary and partial differential equations;
  - Optimization;
  - Applications in engineering and industry
- Potential Projects:
  - Inverse problems in heat transfer & in wave propagation and scattering
  - Using differential equations & machine learning for time series data
  - Using differential equations in water pollution modeling & detection
- Looking for up to 3 students, in particular from underrepresented groups
- Funding: potentially available in fall 2021.
- Time frame: from summer 2021
- Student Skills required:
  - Linear Algebra and Ordinary differential equations.
  - Some knowledge of computer programming (Matlab/Python)
- Contact Info:
  - nguyent@rowan.edu, Robinson 230C

Dr. Juming Pan



- Looking for 2 students, underrepresented minorities are encouraged
- Research Interests:
  - Statistical Learning
  - High-dimensional Data Analysis
- Funding available for 2021
- Student Skills required:
  - Diligent and enthusiastic about research
  - Easy to communicate with
  - Basic statistics knowledge
  - Some experience in programming such as R
- Contact Info:
  - pan@rowan.edu, Robinson 228 I

Dr. Uma Thayasivam



- Research Interests:
  - Statistical Learning, Predictive Modeling in Big Data, Robust Estimation
- Potential Projects:
  - Student predictive modeling
  - Telemedicine and Telehealth Statistical learning
  - Advance statistical computing for modeling big data
  - Robust methods for high dimensional data
  - Open to student driven projects on statistical/data mining
- Looking for interesting students who are willing to gain experience
- Initially unfunded with potential for future funding support including summer funding.
- Time frame: Spring 2021 and beyond!
- Student Skills required:
  - Basic Statistics course
  - Some experience in computing programming
  - Desire to learn and willing to commit some quality time
- Contact Info:
  - thayasivam@rowan.edu, Robinson 230 B

Questions?