

WPI Mathematical Sciences Grants and Awards 2020

Professor Suzanne Weekes named winner of prestigious Humphreys Award

The Executive Committee of the Association for Women in Mathematics has established this prize in memory of M. Gweneth Humphreys to recognize outstanding mentorship activities. The prize is awarded annually to a mathematics teacher (female or male) who has encouraged female undergraduate students to pursue mathematical careers and/or the study of mathematics at the graduate level

This award is named for M. Gweneth Humphreys (1911-2006). Professor Humphreys earned her master's degree from Smith College and her PhD at age 23 from the University of Chicago in 1935. She taught mathematics to women for her entire career, at Mount St. Scholastica College, Sophie Newcomb College, and for over thirty years at Randolph-Macon Woman's College. This award, funded by contributions from her former students and colleagues at Randolph-Macon Woman's College, recognizes her commitment to and her profound influence on undergraduate students of mathematics.

[Professor Suzanne Weekes](#) exemplifies fully the tradition of Gweneth Humphreys. Through her research, her project advising, her REU leadership, her CIMS activities and more, she has contributed significantly to our mission, as few others have. Dr. Weekes' track record in mentoring students (and faculty!) is superb and extends well beyond WPI, to her work with PIC math, and includes her impactful service in MSRI-UP.

For more information about the Humphreys Award, please see

<https://www.wpi.edu/news/wpi-mathematician-receives-prestigious-teaching-award>

Andrea Arnold receives 2019 Women's Impact Network (WIN Impact) Grant

Assistant Professor [Andrea Arnold](#) has received the 2019 Women's Impact Network (WIN Impact) Grant "Sonia Kovalevsky Day: Math Outreach Initiative for Female Middle-School Students". The grant will support Andrea's initiative in organizing SK days at WPI. In her words:

Sonia Kovalevsky Days (SK Days) are nationally-held, locally-organized outreach events with the aim of supporting and encouraging young women to continue their study of mathematics (<https://awm-math.org/programs/math-outreach/>). The recently-formed WPI Chapter of the Association of Women in Mathematics (AWM) is planning to host an SK Day outreach event on campus this spring, specifically targeting the participation of local female middle school students. The day's events will include math activities and problems for the students, as well as a keynote talk from Dr. Misha Kilmer (Tufts), with volunteers from the WPI community. This year's inaugural event is scheduled for Saturday, March 23, 2019, with plans to host subsequent events annually each spring. This award will support the funding of SK Days at WPI for the next two years, to be held in Spring 2019 and Spring 2020

Total award period: 07/01/2019 - 06/30/21 Award Amount: \$10,500

Further Advancing the Northeast Combinatorics Network National Science Foundation

[Martin, W.](#), (Co-PI), Ellis-Monaghan, J., (PI)

Start Date: 3/1/2019 (3 years). Amount: \$39,000

The Northeast Combinatorics Network (NCN) will host several events including Spring and Fall Discrete Math Day (DMD) conferences and a Summer Combo conference as well as a Virtual Combinatorics Colloquium series in each year of the three-year project. The Spring 2018 DMD will be hosted at UMass Amherst,

<https://sites.google.com/view/umass-dms/dmdspring19>, and universities in the region are being given the opportunity to host the remaining five DMD meetings. This project aims to further cultivate and enhance a network of students, post-doctoral researchers, faculty and industry mathematicians spread across the institutions in New England and New York working in the area of combinatorics (discrete mathematics), which is a thriving and rapidly advancing mathematical discipline.

Further information on this grant can be found at

https://www.nsf.gov/awardsearch/showAward?AWD_ID=1853455&HistoricalAward_s=false

Applications of Quasiconformal Geometry and Partial Differential Equations

National Science Foundation, DMS 1955992

[Capogna, L](#)

Start Date: 7/1/2020 (3 years). Amount: \$187,987

Partial Differential Equations (PDE) are used to model real life systems, and in particular, subelliptic PDE are helpful in settings where there is a constrained dynamics. Examples of such systems include the motion of robot arms, structural functions of the first layer of the mammalian visual cortex, the Black-Scholes model for financial markets and quantum computing. Geometric and analytic properties of such spaces are captured in a quantitative fashion by studying the behavior of certain families of transformations of the space into itself. This project aims at studying fine properties of such transformations. In terms of broader impacts, the PI will involve graduate and undergraduate students in several aspects of the research and design outreach activities to attract K12 students to mathematics.

The technical focus of the proposed research addresses a curve shrinking flow in Carnot groups, the study of harmonic extensions of quasiconformal mappings

between boundaries of certain Gromov hyperbolic spaces, and regularity of certain nonlinear, degenerate parabolic PDE.

For more information on this grant, please visit

https://www.nsf.gov/awardsearch/showAward?AWD_ID=1955992&HistoricalAward_s=false

Bayesian Models for Cash Rents by Agricultural Practice IPA Agreement with USDA US Dept. of Agriculture

[Nandram, B.](#)

Award Period: 2020-2021 **Award Amount:** \$149,574

Bayesian nonignorable nonresponse and selection models for small areas Simons Foundation

[Nandram, B.](#)

Award Period: 2015-2021 **Award Amount:** \$35,000

Data Sciences, AI and Machine Learning for Army Applications Army Research Lab (ARL)

[Rundensteiner, E.](#) (PI), [Jian \(Frank\) Zou.](#) (co-PI), [Fatemeh Emdad.](#) (co-PI), [Ziming Zhang](#) (co-PI), [Xiangnan Kong](#)(co-PI)

This project is focused on research in several disciplines from material science to data science and statistics to support the missions of the Aviation & Missile Center Technology Development Directorate. Our aim is to provide sound statistical and data science methodologies and data analysis for their research development and applications. The project is a two-year grant totaling \$854,000 awarded to PI Prof. Rundensteiner, and Co-PIs Profs. Zou, Emdad, Zhang, and Kong.

Award Period: 2019-2021 **Award Amount:** \$854,000