

Five Year Synopsis – Kenneth M. Golden

February 21, 2021

A summary of accomplishments from January 2016 through the present, February 2021; see CV and included materials for details.

Publications. Eighteen papers published. One paper in revision. Eight preprints – manuscripts that have been through 2 or 3 iterations and are close to submission. Journals include *Physical Review Letters*, *Geophysical Research Letters*, *Remote Sensing*, *Journal of Fractal Geometry*, *Journal of Mathematical Physics*, *Annals of Glaciology*, *Annals of Mathematical Sciences and Applications*, *Ecological Complexity*, *Notices of the American Mathematical Society* (including cover), *Journal of Geophysical Research*, *Multiscale Modeling and Simulation*, and *New Journal of Physics*; Editor for *East Antarctic Sea Ice Physics and Ecosystems Processes*, special volume of *Deep Sea Research II* on the Sea Ice Physics and Ecosystem Experiment II; Editor for Springer series on *Mathematics of Planet Earth*.

Grants. PI on three main research grants during this period: two grants on sea ice modeling, one from NSF and one from ONR; one grant on random matrix theory for composites from NSF. PI on two grants for conferences on mathematics of sea ice from ONR. PI on a research instrumentation grant from the University of Utah to buy an immersion freezer (housed in the Physics Department) to explore microbial habitability of the icy moons of Jupiter and Saturn. Total funding \$1,318,367. (2016 was the final year of our \$5M NSF Mathematics Climate Research Network, where 140 young mathematicians were supported in climate research at 12 hubs across the US, including the University of Utah. I was the PI of the Utah component, but none of this funding is included in the total above.)

Polar expeditions. NSF summer camp on Arctic sea ice near Barrow, AK, June 2016.

Invited talks. 77 invited lectures during the 5 years + 3 scheduled (includes 8 during March - December of 2020 which were postponed or canceled due to COVID-19). They include plenary and keynote addresses, colloquia and seminars, and public lectures, *e.g.*: 2016 Carl J. Rees Distinguished Lecture, University of Delaware; 2016 Boeing Distinguished Colloquium in Applied Mathematics, University of Washington; ICERM Public Lecture, Brown University, 2017; Plenary Speaker, 2017 SIAM Annual Meeting, Pittsburgh; 2018 Friends of Math Lecturer, Kansas State University; Invited Lecture, 2018 Oberwolfach Workshop on *Calculus of Variations*; Mathematics Lecturer, Dartmouth's 250th Anniversary, 2018; Opening Keynote Lecture, 2020 Simons Math + X Symposium on Inverse Problems and Deep Learning, Costa Rica; Frontiers of Science Lecture, University of Utah, 2021.

Teaching and mentoring. Please see included documents from the Math Department's 2020-21 nomination of Golden for the Hatch Teaching Prize.

Spring 2016: 15 students in Math 5750/6880, Mathematics and Climate.

Spring 2017: 200 students in two sections of Math 1220, Calculus II.

Fall 2017: 16 students in Math 5750/6880, Mathematics and Climate.

Spring 2018: 120 students in two sections of Math 2210, Calculus III.

Fall 2018: 250 students in two sections of Math 1210, Calculus I.

Fall 2019: 150 students in two sections of Math 2210, Calculus III.

Spring 2020: 25 students in Math 5750/6880, Mathematics and Climate.

Fall 2020: 170 students in two sections of Math 1210, Calculus I.

Summers 2018-20: Led development and co-taught Math Component (4-5 days) of SCI 3000 ACCESS on Mathematics of Climate and Energy (with Jon Chaika), 25-35 students.

Mentored 22 undergraduates (8 current), 5 high school students. Graduated 3 Ph.D. students with postdoc positions at U. Texas Austin, UNC Chapel Hill, and Courant Institute NYU; 5 current Ph.D. students with one (in the Physics Department) expected to finish in May 2021. Two postdocs supervised, one finished, now at Australian Natl. U. Canberra. Two of my undergraduate research students, Rebecca Hardenbrook (2018) and Delaney Mosier (2020), won the Research Scholar Award, the highest research honor given to an undergraduate in the College of Science.

Service. *Department:* Faculty Hiring Committee Chair (2015 – 16); Faculty Hiring Committee (2017 – 2018); Development Committee (2017 – 2018); Scientific Computing and Imaging Institute (SCI) and Math Hiring Committee (2020 - 2021); COVID Task Force (2020 - 2021). *University:* Committee to Review Dept. of Atmospheric Sciences, 2017. *AMS:* AMS Representative to the AMS-MAA-SIAM Gerald and Judith Porter Public Lecture Committee, 2015–2018; Chair, AMS-MAA-SIAM Gerald and Judith Porter Public Lecture Committee, 2017–2018; Member, AMS-SIAM Committee to Select the Winner of the George David Birkhoff Prize, 2017–2018; Member, American Mathematical Society Mathematics Research Communities Advisory Board, 2020–2023.

Organizing activities. Co-organized 4 conferences and 1 minisymposium on mathematics of sea ice, wave science and mathematical geoscience, including Chair, Organizing Committee for Workshop 1: *Multi-scale modelling of ice characteristics and behaviour*, as part of the 2017 Isaac Newton Institute Programme on *Mathematics of Sea-Ice Phenomena*, Fall, Cambridge University. I was also on the Scientific Committee for the Fall Programme.

Awards. 2017 Distinguished Professor of Mathematics.

Media coverage. Articles in 2019 in ScientificAmerican.com, EOS.org (the news outlet for the American Geophysical Union), PhysicsWorld.com and Wired.com on our Ising model for melt ponds on Arctic sea ice; profile in 2016 in *Physics Today*; featured in 2018 SmithsonianMag.com article on the science of making Olympic snow and ice; featured (with Emily Shuckburgh) in 2017 SIAM video on Math Behind Sea Ice and our Changing Planet, and 2016 TV show on our NSF Math Climate Research Network (see CV for more details).