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Samuel-Reynolds-4

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# Samuel E. Reynolds

## Education

- 6/2024 **Ph.D. in Mathematical Sciences**, *Portland State University*, Portland, Oregon  
Dissertation:  $H^1$ -conforming Finite Elements on Nonstandard Meshes
- 4/2020 **M.S. in Mathematics**, *Portland State University*, Portland, Oregon
- 8/2017 **B.S. in Mathematics**, *Portland State University*, Portland, Oregon  
Minor in physics; *magna cum laude*; departmental honors

## Research Interests

My primary research focus is numerical methods for partial differential equations. Specifically, I am working on a finite element method using nonstandard meshes incorporating cells with curved edges and holes, using ideas from virtual element methods and boundary element methods. I also have experience in numerical optimization and high performance computing.

## Positions

### Research positions

- 6/2016–6/2024 **Research assistant**, *Fariborz Maseeh Dept. of Math. & Stats.*, *Portland State University*, Portland, Oregon  
Advisor: Jeffrey Owall
- 6/2022–8/2022 **Computing scholar**, *Lawrence Livermore National Laboratory*, Livermore, California, summer internship  
Mentor: Julian Andej
- 6/2021–8/2021 **Givens associate**, *Argonne National Laboratory*, Chicago, Illinois, summer internship  
Mentor: Richard Tran Mills

### Education positions

- 9/2019–12/2020 **Graduate teaching assistant**, *Fariborz Maseeh Dept. of Math. & Stats.*, *Portland State University*, Portland, Oregon  
Supervisor: Andy Flight  
Courses taught: Calculus I, Calculus IV
- 4/2016–8/2019 **Peer tutor**, *The Learning Center*, *Portland State University*, Portland, Oregon  
Associate Director: Liane O'Banion
- 4/2015–3/2016 **MTH 251 Lab Assistant**, *Math. Dept.*, *Portland Community College*, Portland, Oregon

## Publications

- [6] Jeffrey S. Owall and Samuel E. Reynolds. "Evaluation of Inner Products of Implicitly Defined Finite Element Functions on Multiply Connected Planar Mesh Cells". *SIAM Journal on Scientific Computing* 46.1 (2024), A338–A359.

- [5] Jeffrey S. Owall and Samuel E. Reynolds. “Quadrature for implicitly-defined finite element functions on curvilinear polygons”. *Computers & Mathematics with Applications* 107 (2022), pp. 1–16.
- [4] Akash Anand et al. “Trefftz finite elements on curvilinear polygons”. *SIAM Journal on Scientific Computing* 42.2 (2020), A1289–A1316.
- [3] Nguyen Mau Nam et al. “Clustering and multifacility location with constraints via distance function penalty methods and dc programming”. *Optimization* 67.11 (2018), pp. 1869–1894.
- [2] Nguyen Mau Nam et al. “Nesterov’s smoothing technique and minimizing differences of convex functions for hierarchical clustering”. *Optimization Letters* 12 (2018), pp. 455–473.
- [1] Jeffrey S. Owall and Samuel E. Reynolds. “A high-order method for evaluating derivatives of harmonic functions in planar domains”. *SIAM Journal on Scientific Computing* 40.3 (2018), A1915–A1935.

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## Selected Presentations

- 6/2022 **A Finite Element Method on Exotic Meshes**, *MSRI Summer Graduate School: Integral Equations and Applications (Poster Session #2)*, Mathematical Sciences and Research Institute, Berkeley, California
- 5/2022 **Finite Elements with Curved and Punctured Cells**, *SIAM Pacific Northwest Section Meeting*, Washington State University Vancouver, Vancouver, Washington
- 3/2021 **A Finite Element Method Using Curvilinear Meshes**, *SIAM Conference on Computational Science and Engineering (CSE21)*, Virtual conference
- 4/2018 **Computing Interior and Boundary Derivatives of Harmonic Functions in Planar Domains with Harmonic Conjugates**, *SIAM Annual Meeting (AN18)*, Portland, Oregon
- 8/2017 **Finding Derivatives of Harmonic Functions with Cauchy’s Integral Formulas**, *Northwest Undergraduate Mathematics Symposium (NUMS 2017)*, Western Washington University, Bellingham, Washington

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## Awards and Honors

- 2022–2024 **NSF Research Training Group Graduate Fellowship**, *National Science Foundation*
- 2020 **Excellence in Remote Teaching Award**, *Fariborz Maseeh Dept. of Math. & Stats., PSU*
- 2019 **Level III (Master) Tutor Certification**, *College Reading & Learning Association*
- 2019 **F. S. Cater Prize**, *Fariborz Maseeh Dept. of Math. & Stats., PSU*
- 2016 **Christine and David Vernier STEM Scholarship**, *PSU College of Liberal Arts and Sciences*
- 2015 **Oregon NASA Space Scholarship**, *Oregon Space Grant Consortium*

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## Computing Skills

- Languages Python, C, C++, Matlab
- Software  $\LaTeX$ , git, Wolfram Mathematica
- Operating systems Linux, MacOS, Windows

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## Further Information

Also known as Sam Reynolds  
Pronouns he/him/his  
Country of citizenship United States of America