Ellen E. Eischen

eeischen@uoregon.edu http://www.elleneischen.com

Organization of this CV

§1 Professional profile; §2 Research; §3 Teaching; §4 Service; §5 Outreach.

More detailed CV available upon request.

1. Professional profile

- **Professional foci and objectives**

  Contribute to research developments in number theory and beyond; expand participation in mathematics; and communicate with broader communities.

- **Primary employment**
  - University of Oregon, Professor (previous: Associate and Assistant Professor), 2015–
  - The University of North Carolina at Chapel Hill, Assistant Professor, 2012–2015
  - Northwestern University, Ralph Boas Assistant Professor, 2009–2012

- **Visits**
  - Institute for Advanced Study in Princeton, von Neumann Fellow, 2024–2025
  - SLMath/MSRI, Research Professor (spring) and Member (fall), 2022–2023
  - ICERM, Research Fellow, fall 2019
  - Caltech, Invited Guest, November–December 2018
  - EPFL in Switzerland, Invited Academic Guest, August and December 2017
  - Columbia University, Visiting Scholar, spring 2014

- **Education**
  - University of Michigan, Ann Arbor, PhD in Mathematics, 2009
  - Princeton University, A.B. *summa cum laude* in Mathematics, 2003

- **Honors and Grants**
  - von Neumann Fellowship, Institute for Advanced Study in Princeton, 2024–2025
  - NSF CAREER Grant, 2018–2024
  - Continuous NSF research grant support as sole PI: DMS-2302011 ('23-'26), DMS-1751281 ('18-'24), DMS-1559609 ('15-'19), DMS-1249384 ('12-'15). Also collaborative research grant DMS-1557642 ('15-'17) and conference grant DMS-1601959 ('16).
  - Other external funding includes NSA MSP conference grant '21–'23, AIM SQuaRE '18, BIRS FRG '14, US Junior Oberwolfach Fellow '14.
  - Fellow of the Association for Women in Mathematics, 2024
  - Robert Calderbank and Ingrid Daubechies Scholar, Duke University, 2023–2025
  - Teaching awards: Excellence in Remote Teaching (Oregon '20), Williams Fund for Undergraduate Education (Oregon '20), Excellence in Teaching (Northwestern '11)

2. Research

- **Primary research focus**

  Number theory, especially algebraic and p-adic aspects of *L-functions* and *automorphic forms*, analytic functions that encode data arising in number theory and beyond. Connections with other areas.

- **Research papers**

  - *Algebraicity of Spin L-functions for* GSp_6. E. Eischen, G. Rosso, and S. Shah. 60 pages. August 2024 preprint. `https://arxiv.org/pdf/2408.03442`.
  - *Constructing vector-valued automorphic forms on unitary groups.* T. L. Browning, P. Čoupek, E. Eischen, C. Frechette, S. Hong, S.-Y. Lee, and D. Marcil. 32 pages. Submitted in September 2024. `https://arxiv.org/abs/2408.05198`
  - *Archimedean zeta integrals for unitary groups.* E. Eischen and Z. Liu. Journal für die reine und angewandte Mathematik (Crelles Journal) 2024 (2024), No. 813, 103–132. `http://dx.doi.org/10.1515/crelle-2024-0035`
  - *Automorphic forms on unitary groups.* E. Eischen. In Automorphic Forms Beyond GL_2: Lectures from the 2022 Arizona Winter School. Mathematical Surveys and Monographs 279, American Mathematical Society (2024), 1–58. `https://doi.org/10.1090/surv/279`
  - *Entire theta operators at unramified primes.* E. Eischen and E. Mantovan. International Mathematics Research Notices (2022), No. 21, 16405–16463. `https://doi.org/10.1093/imrn/rnab190`
  - *p-adic families of automorphic forms in the μ-ordinary setting.* E. Eischen and E. Mantovan. American Journal of Mathematics. Vol. 143 (2021), No. 1, 1–52. `https://doi.org/10.1353/ajm.2021.0006`
  - *An Introduction to Eisenstein Measures.* E. Eischen. Journal de Théorie des Nombres de Bordeaux. Vol. 33 (2021), No. 3.1, 779–808. `http://doi.org/10.5802/jtnb.1178`
  - *Differential operators mod p: analytic continuation and consequences.* E. Eischen, M. Flander, A. Ghitza, E. Mantovan, and A. McAndrew. Algebra & Number Theory. Vol. 15 (2021), No. 6, 1469–1504. `http://doi.org/10.2140/ant.2021.15.1469`
  - *p-adic L-functions for unitary groups.* E. Eischen, M. Harris, J.-S. Li, and C. Skinner. Forum of Mathematics, Pi. Vol. 8 (2020), E9, 160 pages. `http://doi.org/10.1017/fmp.2020.4`
  - *Applications of nonarchimedean developments to archimedean nonvanishing results for twisted L-functions.* E. Eischen. Math. Res. Lett. 27 (2020), no. 4, 973–1002. `https://dx.doi.org/10.4310/MRL.2020.v27.n4.a2`
  - *A gallery of Gaussian periods.* E. Eischen and S. Garcia. Proceedings of Bridges 2020: Mathematics, Art, Music, Architecture, Education, Culture. Carolyn Yackel, Robert Bosch, Eve Torrence, and Kristóf Fenyvesi, eds., Tessellations Publishing (2020), 243–248. `http://archive.bridgesmathart.org/2020/bridges2020-243.html`
    Associated app: `https://apps.apple.com/us/app/gaussianperiods/id1622050577`

Research papers, continued

- *Bootstrapping estimates of stability for clusters, observations, and model selection.* H. Yu, B. Chapman, A. Di Florio, E. Eischen, D. Gotz, M. Jacob, and R. Hageman Blair. Computational Statistics. Vol. 34 (2019), Issue 1, 349–372. http://doi.org/10.1007/s00180-018-0830-y
  Associated R package: https://cran.r-project.org/web/packages/bootcluster/bootcluster.pdf
- *Differential operators and families of automorphic forms on unitary groups of arbitrary signature.* E. Eischen, J. Fintzen, E. Mantovan, and I. Varma. Doc. Math. 23 (2018), 445–495. http://doi.org/10.25537/dm.2018v23.445-495
- *p-adic Eisenstein series and L-functions of certain cusp forms on definite unitary groups.* E. Eischen and X. Wan. J. Inst. Math. Jussieu. 15 (2016), no. 3, 471–510. http://dx.doi.org/10.1017/S1474748014000395
- *Differential operators, pullbacks, and families of automorphic forms.* E. Eischen. Ann. Math. Qué. 40 (2016), no. 1, 55–82. http://dx.doi.org/10.1007/s40316-015-0049-z
- *p-adic q-expansion principles on unitary Shimura varieties.* A. Caraiani, E. Eischen, J. Fintzen, E. Mantovan, and I. Varma. Directions in Number Theory: Proceedings of the 2014 WIN3 Workshop. Springer International Publishing (2016), 197–243. http://dx.doi.org/10.1007/978-3-319-30976-7_7
- *A p-adic Eisenstein measure for unitary groups.* E. Eischen. J. Reine Angew. Math. 699 (2015), 111–142. http://dx.doi.org/10.1515/crelle-2013-0008
- *A p-adic Eisenstein measure for vector-weight automorphic forms.* E. Eischen. Algebra Number Theory. 8 (2014), No. 10, 2433–2469. http://dx.doi.org/10.2140/ant.2014.8.2433
- *p-adic differential operators on automorphic forms for unitary groups.* E. Eischen. Ann. Inst. Fourier (Grenoble). 62, No. 1 (2012), 177–243. http://dx.doi.org/10.5802/aif.2704
- *Decomposition of almost complete tripartite graphs into two isomorphic factors of fixed diameter.* E. Eischen. Discrete Math. 306 (2006), 745–761. http://dx.doi.org/10.1016/j.disc.2006.02.009
- *Patterns, linesums, and symmetry.* E. Eischen, C. Johnson, K. Lange, and D. Stanford. Linear Algebra Appl. 357 (2002), 273–289. http://dx.doi.org/10.1016/S0024-3795(02)00417-2

- **Invited lectures**

  Over 100 invited lectures, including over 12 since September 2023. During past several years, includes lecture series (e.g. Arizona Winter School), colloquia (e.g. at Harvard, UC Berkeley, Caltech, Rice), research seminars (e.g. Stanford, MIT, Yale, Duke), research conferences (e.g. at MSRI/SLMath, BIRS, Bonn, ICMS), talks for students (e.g. at Swarthmore, Harvard, UC Berkeley, Reed), and career path talks (e.g. at U. Utah, UCSD).

- **Computer app to help visualize number theoretic data**

  The `Gaussian Periods` computer app is available on the Mac App Store.
  https://apps.apple.com/us/app/gaussianperiods/id1622050577

3. Teaching

- **Mentorship and supervision**
  - PhD supervisor to Cathy Hsu '18 (current position: tenure-track assistant professor, Swarthmore College), Jonathan Aycock '22 (current position: Stefan E. Warschawski Visiting Assistant Professor, UCSD), Samantha Platt '24 (current position: assistant professor, Augsburg University), Sean Haight '24 (current position: adjunct, Seattle University), Francis Dunn (PhD expected '25), Sidney Washburn (PhD expected '28)
  - NSF postdoctoral mentor to Maria Fox (current position: tenure-track assistant professor, Oklahoma State University) and postdoctoral mentor to Vivek Pal
  - Research supervisor to undergraduates Abby Lewis, Nat Milnes, Robert Macy, Max Dickinson, and Heidi van Batenburg-Stafford
- **Undergraduate course development**
  - Developed new course, *Math and the Creative Process: A Participatory Exploration of Number Theory*, to introduce undergraduates early in their education to skills for exploring and communicating about math.
    `https://pages.uoregon.edu/eeischen/CreativityCounts/course/`
  - Designed elaborate cryptography scavenger hunt for students in Mathematical Methods of Cryptography.
    `http://www.elleneischen.com/cryptography-scavenger-hunt.html`
- **Courses taught**

  Range from beginning undergrad to advanced graduate. Courses taught at U. Oregon: Abstract Algebra (Math 44x/54x), Algebraic Number Theory (Math 607), Math and the Creative Process: A Participatory Exploration of Number Theory (Math 199), Modular Forms (Math 684), Linear Algebra (Math 441/451), Mathematical Cryptography (Math 458), Statistics (Math 461/561), and Multivariable Calculus (Math 281/282).
- **Reading courses**

  Nearly every term, including 7-person reading courses in Winter '22 and '24.

4. Selected service

- **Editorial boards**
  - Member of Editorial Board for the journal *Essential Number Theory*, 2021–present
  - Member of Editorial Board for the journal *Research in Number Theory*, 2020–present
  - Co-editor of *Directions in Number Theory: Proceedings of the 2014 WIN3 Workshop*. Springer International Publishing (2016).

- **Conference, workshop, and program organization**
  - Coorganized semester-long research program at SLMath/MSRI in spring 2023
  - Coorganized 11 conferences/workshops/special sessions since 2016:
    - Co-organized (with H. Darmon, B. Howard, E. Mantovan) Introductory Workshop on Euler Systems and Special Values of L-functions, MSRI, January 2023
    - Co-organized (with H. Darmon, B. Howard, E. Mantovan) Connections Workshop on Euler Systems and Special Values of L-functions, MSRI, January 2023
    - Co-organized (with S.W. Shin, L. Xiao) Number Theory and Arithmetic Geometry session, Pacific Rim Mathematical Association Congress, Vancouver, Canada, December 2022
    - Organized 2 weeklong workshops: collaborative research workshop to promote diverse collaborations and instructional workshop on recent developments, U. Oregon, July and August 2022 `https://sites.google.com/view/automorphic2021`
    - Co-organized (with M. Dimitrov, A. Jorza) weeklong instructional workshop and weeklong conference on p-adic L-functions and eigenvarieties, Notre Dame, July 2022
    - Co-organized (with D. Barrera Salazar, L. Alberto Lomelí, A Pacetti, C. Sorensen) session on Galois representations and automorphic forms, Mathematical Congress of the Americas, Buenos Aires, Argentina, July 2021
    - Co-organized (with J. Kamnitzer, A. Kontorovich, K. Stange) Illustrating Algebra and Number Theory workshop, week-long workshop as part of the semester-long ICERM program Illustrating Mathematics, Brown University, Providence, RI, October 2019
    - Co-organized (with Y. Liu, L. Xiao, W. Zhang) AMS Special Session on Special Values of L-functions and Arithmetic Invariants in Families, Spring Eastern Sectional Meeting, University of Connecticut, Hartford, CT, April 2019
    - Co-organized (with A. Bucur) the AMS/MAA Joint Mathematics Meetings AWM Workshop (special session on number theory), Atlanta, GA, January 2017
    - Co-organized (with J. Rouse, K. Thompson) the 30th Automorphic Forms Workshop, Wake Forest University, Winston-Salem, NC, March 2016

- **Service to professional organizations**
  - Scientific Review Panel, Pacific Institute for the Mathematical Sciences, 2023–2026
  - AMS Committee on the Profession, 2020–2023
    -Subcommittee to analyze the report from Committee on Professional Ethics (COPE)
    -Subcommittee to organize panel on COVID and the Profession for JMM 2022
    -Subcommittee to organize panel on Careers Outside Academia for JMM 2023
    -Subcommittee on mitigating the effects of COVID-19
  - AMS Liaison Committee with the AAAS, 2020–2022
  - MAA Committee on the Earle Raymond Hedrick Lectures, 2022–2025
  - AWM Joint Mathematics Meetings committee, 2016

- **Selected university and departmental service**
  - Post-Tenure Review Committee (elected 3-person committee), '23–'24
  - College of Arts and Sciences Women in Science Mentoring Group, '23-'24
  - At-Large Graduate Affairs Committee, UO Math Department, '18-'19, '21-'22, '23-'24
  - Teaching Effectiveness Committee, UO Math Department, '21-'22
  - Undergrad Research Opportunity Program Faculty Advisory Committee, UO, '21–'22
  - Faculty supervisor, Oregon Undergraduate Mathematics Club, '18–'22
  - Organizer of Number Theory Seminar, most years 2010–present
  - Graduate Advising Committee, UO Math Department, '19–'21
  - PhD Committee, UO Math Department, '19–'20
  - Open Tenure-Track Search Committee, UO Math Department, '18–'19
  - Executive Committee, UO Math Department, '18–'19
  - Search committee for UO Director of McNair Scholars Program, '18
  - Committee chair, Niven and Moursund Distinguished Lectures, U. Oregon, '17–'18
- **Selected projects to promote broader participation**
  - Created research workshop to facilitate new, diverse research collaborations. `https://sites.google.com/view/automorphic2021/collaborative-research-workshop`
  - Spearheaded the creation of the AWM Reading Room at the University of Oregon. Featuring resources to help women and other members of underrepresented groups thrive at UO and beyond. `https://pages.uoregon.edu/uoawm/library.html`
  - Led a research project at Women in Numbers 3 (co-leader: A. Caraiani)

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5. Selected outreach

- **Museums**
  - Serve on the Advisory Board and the Exhibits Committee for the newly forming Seattle Universal Math Museum, 2021–present
  - Organized *Creativity Counts* exhibit, on display for 3 months at the Jordan Schnitzer Museum of Art in 2021.
    `https://jsma.uoregon.edu/art/exhibition/creativity-counts`
    *Accompanying virtual exhibit quickly became JSMA's most-visited virtual exhibit and was extended to run for over three years, during which it has been viewed from 63 countries and 474 cities. `https://mpembed.com/show/?m=FGvT8EzPQpy&mpu=885`
- **Improv**

  Develop and lead workshops for faculty and graduate students that integrate principles of improvisational theater for engagement in the classroom and beyond, 2018–present
  `http://www.elleneischen.com/improv-1.html`
- **Lectures for broader audiences**

  Developed and chaired Oregon's *Distinguished Lectures for Students*, 2015–2024
  `http://blogs.uoregon.edu/mathisawesome/`

- **Nontechnical writing**
  - *Time for Math.* E. Eischen. Notices of the American Mathematical Society. Accepted for publication in the December 2024 issue.
  - *Planting Seeds for Community.* E. Eischen and C. Hsu. Notices of the American Mathematical Society. Vol. 69 (2022), no. 10, 775–777. https://www.ams.org/journals/notices/202210/rnoti-p1738.pdf?adat=November%202022&trk=2563&cat=career&galt=career.
  - *The Seattle Universal Math Museum: Transforming Perceptions of Math.* E. Eischen. MAA FOCUS. Oct/Nov 2022. Vol. 42, No. 5, 6–7. https://digitaleditions.walsworth.com/publication/?i=762972&article_id=4354785&view=articleBrowser
  - *Illustrating Mathematics.* E. Eischen. Review of *Illustrating Mathematics*, by D. Davis. Math Horizons. Vol. 29 (2022), no.1, 29–29. http://doi.org/10.1080/10724117.2021.1940509
  - *Creativity Counts.* E. Eischen. Math Buffet column in the *Girls' Angle Bulletin.* Vol. 15 (2021), no. 1, 12–16 and cover image. http://www.girlsangle.org/page/bulletin-archive/GABv15n01E.pdf
  - *Moving Ahead in Your Research.* E. Eischen. Notices of the American Mathematical Society. Vol. 66 (2019), no. 2, 194–195. http://dx.doi.org/10.1090/noti1791
  - *Improv-ing a Mathematician's Professional Skills.* E. Eischen. MAA FOCUS. Dec 2016/Jan 2017. Vol. 36, No. 6, 22–24. http://bit.ly/2ikwVg9
  - *5 Key Takeaways from the Innovations Lab.* E. Eischen. August 2015. Report on the first NIH/NSF Innovations Lab. http://bit.ly/2igAjwK
- **Selected interviews**
  - *The Secret Math Journal - with Ellen Eischen*, Numberphile Podcast, hosted by Brady Haran. July 30, 2024. https://www.numberphile.com/videos/ellen-eischen-podcast
  - *QED: a conversation about math and math education. Hosted by Ingrid Daubechies Featuring Ellen Eischen*, National Museum of Math (virtual program), November 16, 2023. https://momath.org/civicrm/?page=CiviCRM&q=civicrm%2Fevent%2Finfo&reset=1&id=9656
  - *Oregon professors focus on equity, accessibility in STEM*, KGW (NBC affiliate), hosted by Brittany Falkers, February 11, 2022. https://www.kgw.com/article/features/oregon-professors-focus-equity-accessibility-in-stem/283-a5adab25-d9f6-47bd-a906-24e68dd6ccb1
  - *Creativity Counts: An exhibit inspired by mathematical processes*, Ester Barkai, Eugene Weekly, June 24, 2021. https://eugeneweekly.com/2021/06/24/creativity-counts/
  - *Mathematicians Find Long-Sought Building Blocks for Special Polynomials*, Kelsey Houston-Edwards, Quanta Magazine, May 25, 2021. https://www.quantamagazine.org/mathematicians-find-polynomial-building-blocks-hilbert-sought-20210525/
  - *Stepping Outside the Mold to Improv-e Mathematics.* Winning submission to the AWM/Math for America high school essay contest, 2021 https://awm-math.org/awards/student-essay-contest/2021-student-essay-contest-results/2021-student-essay-contest-high-school-winner/