Chris Gerig

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Academic Appointments

2021–2022 **Simons Center for Geometry & Physics**, *Research Assistant Professor*
2018–2021 **Harvard University**, *NSF Postdoctoral Fellow* and *Lecturer*

Education

2012–2018 **UC Berkeley**, *Mathematics*, **PhD**
Advisor: Michael Hutchings
2011–2012 **UC Berkeley**, *Experimental Physics* (PhD program)
2007–2011 **Cornell University**, *Applied & Engineering Physics*, **BS**
Magna cum laude, with Honors thesis

Research Focus

Geometric analysis, Differential geometry, Low-dimensional topology (gauge theory & symplectic geometry)

Papers

1. *Generic transversality for unbranched covers of closed pseudoholomorphic curves*
(with C. Wendl) Commun. Pure Appl. Math **70** (2017), no. 3, 409–443
2. *Taming the pseudoholomorphic beasts in* $\mathbb{R} \times (S^1 \times S^2)$
Geom. Topol. **24** (2020), no. 4, 1791–1839
3. *Seiberg–Witten and Gromov invariants for self-dual harmonic 2-forms*
Geom. Topol. **26** (2023), no. 8, 3307–3365
4. *No homotopy 4-sphere invariants using ECH = SWF*
Algebr. Geom. Topol. **21** (2021), no. 5, 2543–2569
5. *Lagrangian torus invariants using ECH = SWF*
J. Symplectic Geom. **19** (2021), no. 4, 959–992
6. *G_2 holonomy, Taubes' construction of Seiberg–Witten invariants and superconducting vortices*
(with S. Cecotti & C. Vafa) J. High Energy Phys. **04** (2020), no. 38, 0–20
7. *$PU(2)$ monopoles and Casson invariants*
(with A. Doan) In preparation, preprint available upon request
8. *Seiberg–Witten critical points on symplectic 4-manifolds*
(with R. Prasad) In preparation

Awards & Grants

2021–2024 NSF Standard Grant, DMS#2147753
(Quote: *"The panel agreed that the proposal contained beautiful ideas and important techniques"*
2018–2021 NSF Postdoctoral Research Fellowship, DMS#1803136
2018 Herb Alexander Prize (top PhD dissertation in math at UC Berkeley)

Teaching

Fall 2021 **Lecturer**, Math 644: Seiberg–Witten theory (at Stony Brook University)
Spring 2021 **Lecturer**, Math 285x: Seiberg–Witten theory and generalizations (at Harvard)
Fall 2020 **Lecturer**, Math 136: Differential Geometry (at Harvard)
Spring 2020 **Lecturer**, Math 21A: Multivariable Calculus (at Harvard)
Fall 2019 **Lecturer**, Math 261x: Embedded Contact Homology (at Harvard)
Sp'17 Sp'18 **Assistant**, Math 32: PreCalculus (at UC Berkeley)
Summer 2017 **Assistant**, Math W53: Multivariable Calculus, online course (at UC Berkeley)
Spring 2016 **Instructor**, Math 191: Knot Theory, introduction to research (at UC Berkeley)
Fall 2012 **Assistant**, Physics C10: Physics for Future Presidents (at UC Berkeley)
Fa'11 Sp'12 Su'12 **Assistant**, Physics 7A: Newtonian Mechanics (at UC Berkeley)

Service

Referee: J Eur Math Soc, Geom Topol, Commun Anal Geom, J Diff Geom
MathOverflow: highly active contributor $\sim$ 11 years
Fa'18 – Sp'20 **Sole Organizer**, Harvard's *Gauge-Topology-Symplectic* seminar

Fa'14 – Fa'16 **Co-chair**, UC Berkeley's *Graduate Social Club* (subset of graduate government)

Su'11 Fa'11 **Graduate Student Researcher**, Stamper-Kurn's atomic physics group (at UC Berkeley)

Undergraduate Research @ Cornell University

2008–2011 **Experimental Physics under** Seamus Davis
topic: *detect deviations from Newton's Law of gravitation using low temperature techniques*
– designed/built Cavendish-type apparatus, ran experiments, wrote Honors thesis

2008–2011 **Mathematics under** Kenneth Brown
topic: *group cohomology*
– wrote solutions manual to Brown's book *Cohomology of Groups* (available on webpage)
– calculated special ideals for a class of groups, available at `arxiv.org/abs/1006.4836`

Coding Language

C++ and Python (including Pandas)

Recommendations

1. Michael Hutchings
   `hutching@math.berkeley.edu`
2. Clifford Taubes
   `chtaubes@math.harvard.edu`
3. Simon Donaldson
   `sdonaldson@scgp.stonybrook.edu`
4. Peter Kronheimer
   `kronheim@math.harvard.edu`
5. Tomasz Mrowka
   `mrowka@math.mit.edu`
6. Denis Auroux
   `auroux@math.harvard.edu`
7. John Lott (teaching)
   `lott@berkeley.edu`

8. Michael Freedman
   `michaelf@microsoft.com`