

**Experience**      • Sub-Riemannian geometry, Microlocal Analysis, Representation theory.

**Research Interest**      • Geometric Inverse Problems. Spectral theory of hypoelliptic PDEs.

**Education**

- **University of California, Santa Cruz**, Ph.D., Mathematics, June 2020.  
Thesis title: “[Unraveling Geodesic X-ray Transforms on the Heisenberg Group](#).”  
Co-Advisors: François Monard, Richard Montgomery.
- **University of California, Santa Cruz**, M.A., Mathematics, June 2015.
- **University of California, Santa Cruz**, B.A., Pure Mathematics (with honors; Physics minor) June 2014.

**Employment**

- **University of Bath**, Postdoctoral Research Associate, Jan. 2021–present.  
[Quantum Limits for Subelliptic Operators](#)  
Funded by the Leverhulme Trust under Véronique Fischer (PI) and Clotilde Fermanian-Kammerer (Co-PI)
- **University of California, Santa Cruz**, Graduate Researcher/Graduate Student Instructor/Teaching Assistant, Sep. 2014–Jun. 2020.

**Accepted Publications**

1. S. Flynn “Singular Value Decomposition of the X-ray Transform on the Reduced Heisenberg group, and a Two-Radius Theorem” (Proceeding) To appear in Springer Volume, Trends in Mathematics: Ghent Analysis and PDE Center. (2023)
2. C. Fermanian-Kammerer, V. Fischer, and S. Flynn. “[Some Remarks on Semi-Classical Analysis on Two-Step Nilmanifolds](#)” (Proceeding) To appear in the [Springer INdAM Series](#) (2022).
3. C. Fermanian-Kammerer, V. Fischer, and S. Flynn. “[Geometric invariance of the semi-classical calculus on nilpotent graded Lie groups.](#)” *Journal of Geometric Analysis* (2023).
- 4 S. Flynn. “[Injectivity of the Heisenberg X-ray transform.](#)” *Journal of Functional Analysis* 280.5 (2021): 108886.

**Articles in preparation**

1. S. Flynn. Working Title: “Spectral Resolution and Injectivity Sets for the X-ray transform on H-type Groups.” See [webpage](#) for updates.
2. C. Fermanian-Kammerer, V. Fischer, and S. Flynn. Working Title: “A Non-commutative Semi-classical Calculus on Filtered Manifolds and Applications to Semi-classical Measures” See [webpage](#) for updates.
3. C. Fermanian-Kammerer, V. Fischer, and S. Flynn. Working Title: “A Microlocal Calculus on Filtered Manifolds with Non-commutative symbols” See [webpage](#) for updates.

## Selected Research Experience

- 2019, Mathematics Sciences Research Institute, UC Berkeley  
[Microlocal Analysis](#)  
Invited as a Program Associate for the Fall 2019 semester.
- 2019, UC Santa Cruz  
[Explicit methods for linear and non-linear tomography](#)  
Supported as Graduate Student Researcher on the NSF grant titled above (DMS-1814104, 2018-2020, PI: François Monard).

## Invited Talks

- March 2023 - *Inhomogeneous Semi-classical calculus with noncommutative symbols*  
CAGE mini-seminar  
Sorbonne Université
- November 2022 - *Geometric Invariance of the Semi-Classical Calculus on Graded Lie groups.*  
Conference on Noncommutative Analysis and PDEs [Link](#)  
Queen Mary University of London.
- November 2022 - *Tensor Tomography on H-type groups.*  
Geometry and Analysis Seminar [Link](#)  
University of Bristol
- May 2022 - *The Heisenberg X-ray transform: A first approximation Inverse Problems on sub-Riemannian manifolds.*  
Analysis and Differential Geometry International Seminar [Link](#)  
University of Aveiro
- March 2022 - *The Spectral Decomposition of sR-Ray Transforms*  
AGeNT Seminar [Link](#)  
University of Bath
- November 2021 - *Unraveling the Heisenberg X-ray Transform*  
Problèmes Spectraux en Physique Mathématique [Link](#)  
Institut Henri Poincaré
- September 2021 - *Unraveling X-ray Transforms on Heisenberg group*  
Bath Analysis Seminar [Link](#)  
University of Bath
- April 2021 - *Unraveling the Heisenberg X-ray Transform*  
Sub-Riemannian Seminars [Link](#).  
(Online).
- May 2020 - *Quantizing The Fourier Slice Theorem*  
UC Santa Cruz Geometry and Analysis Seminar.
- January 2020 - *Integral Geometry on Contact Manifolds*  
Joint Mathematics Meeting, Denver Colorado.
- September 2019 - *Integral Geometry on Contact Manifolds*  
Mathematics Sciences Research Institute, Berkeley CA.
- November 2019 - *Noncommutative methods for inverting the Subriemannian X-ray transform on the Heisenberg group*  
Mathematical Sciences Research Institute, Berkeley, CA.
- April 2019 - *Inverting the Heisenberg X-ray Transform*  
AMS Sectional meeting, Sub-Riemannian and CR Geometric Analysis, University of Connecticut, Hartford.

## Teaching Experience

- March 2019 - *Inverting the Heisenberg X-ray Transform*  
Graduate Student Geometry and Topology Conference, University of Illinois, Urbana-Champaign.
- June 2018 - *The Heisenberg X-ray Transform*  
UC Santa Cruz Geometry and Analysis Seminar.
- April 2017 - *X-rays and Heisenberg*  
Eastern Illinois Integrated Conference in Geometry, Dynamics and Topology.

- **University of Bath, Bristol, Imperial, Oxford, Warwick and Swansea** (planned)

I am preparing to a graduate level course in Geometric Mechanics to be delivered through the [Taught Course Center](#) in the October to December 2023 session.

TCC is a collaboration between the Mathematics Departments at the Universities of Bath, Bristol, Imperial, Oxford, Warwick and Swansea. TCC offers graduate courses to all participating universities, delivered through Microsoft Teams.

- **University of California, Santa Cruz**

**Graduate Student Instructor:** As a GSI, I independently taught one lower and three upper division mathematics classes for 20 hours per week concurrently with my graduate studies. I was responsible to give lectures, write exams, assign homework, manage a teaching assistant, assess students' work and distribute grades.

### Lower Division:

Summer 2017 Math 3      Precalculus

### Upper Division:

Summer 2019 Math 105A Real Analysis

Spring 2019 Math 105B Real Analysis

Summer 2018 Math 105A Real Analysis

- **Teaching Assistant:** I have six years experience working as a teaching assistant 20 hours per week concurrently with my graduate program. My duties included delivering axillary lectures, review sessions, grading work/exams and holding office hours.

### Elementary Courses:

Math 2 CL (Collaborative Learning), College Algebra (Funded by Title V HSI grant)\*

Math 3, Precalculus

Physics 5, 5L, Intro to Physics (Lab)

\*For Math 2 CL, I revied additional training to address the needs of students from disadvantaged background.

### Lower Division:

Math 11A, Calculus with Applications

Math 19A, Calculus for Science, Engineering, and Mathematics

Math 19B, Calculus for Science, Engineering, and Mathematics

Math 21, Linear Algebra

Math 23A, Vector Calculus

Math 23B, Vector Calculus

Upper Division:

Math 100, Intro to Proofs

Math 105A, Real Analysis

Math 105B, Real Analysis II

Math 152, Programming for Math (Python)\*\*

\*\*I taught students to use Python (in Jupyter) to visualize, formulate and test number-theoretic conjectures, such as the Collatz conjecture.

- **Directed Reading Program Mentor**

Supervised an undergraduate research project on the isoperimetric problem at UC Santa Cruz. The student presented their work at the end of the semester. (Spring 2018.)

## Funding

### Grants

- June 2022 - Grant for travel and accommodation to attend the conference “Conformal Geometry, Analysis and Physics” at the University of Washington. Funded by the Clay Mathematics Institute Enhancement and Partnership Program. \$1000.
- January 2022 - Travel Grant from the London Mathematics Society to attend the ICM 2022: £400 + accommodation (canceled)
- August 2019 - Supported in 2019 as Graduate Student Researcher on the NSF grant “[Explicit methods for linear and non-linear tomography](#)” (DMS-1814104, 2018-2020, PI: Francois Monard).
- July 2015 to Present - UC Santa Cruz Travel/Research Grants, totaling  $\approx$  \$5000.

### Fellowships

- September 2021 - Fellowship to attend *The Unity of Mathematics: A conference in honor of Sir Michael Atiyah, Isaac Newton Institute*: Travel and accommodation
- June 2020 - UC Santa Cruz Mathematics Department Summer Research Fellowship, \$3000.
- June 2019 - UC Santa Cruz Mathematics Year-End Fellowship, \$4000. Fellowship awarded to support research over the summer.

### Awards

- June 2015 - UC Santa Cruz Mathematics Early Academic Achievement Award (\$500 funding award for early completion of Preliminary Exams).

## Service

- 2023 - Reviewer for the *Journal of Functional Analysis*.
- 2022 - Organizer of the Bath Analysis Seminar, University of Bath
- 2022 - Organizer of the University of Bath Postdoc Away Day.
- Fall 2019 - Organizer, Graduate Student Seminar, MSRI.
- Spring 2018 - Organizer, Graduate Differential Geometry Seminar, UC Santa Cruz.
- Fall 2018 - Organizer, Microlocal Analysis Seminar, UC Santa Cruz.

<b>Workshops</b>	<p>Any workshop or school that involved training in a specialized field of math.</p> <ul style="list-style-type: none"> <li>• 2022 - Winter School: Foliations, Pseudodifferential Operators and Groupoids Mathematical Institute of the University of Göttingen.</li> <li>• 2019 - Introductory Workshop: Microlocal Analysis MSRI, UC Berkeley</li> <li>• 2019 - Subriemannian Geometry and Beyond II University Jyväskylä (Invited to give a poster presentation).</li> <li>• 2018 - Subriemannian Geometry and Beyond University of Jyväskylä.</li> <li>• 2017 - Seminaire de Mathematiques Superieures: Contemporary Dynamical Systems, University of Montreal.</li> <li>• July 2015 - Seminaire de Mathematiques Superieures: Geometric and Computational Spectral Theory, University of Montreal.</li> </ul>
<b>Recent Conferences</b>	<ul style="list-style-type: none"> <li>• 2023 - Geometry and Control in Cortana</li> <li>• 2022 - Conference on Noncommutative Analysis and PDEs. London Mathematical Society and Queen Mary University</li> <li>• 2022 - Tomography Across the Scales: Geometrical Inverse Problems Johann Radon Institute</li> <li>• 2022 - Inverse Problems in Analysis and Geometry University of Helsinki</li> <li>• 2022 - AMS-SMF-EMS Joint International Meeting 2022, Special Session in Sub-Riemannian Geometry Université Grenoble Alpes</li> <li>• 2022 - Conformal Geometry, Analysis and Physics University of Washington</li> <li>• 2021 - Pauda Paris Sub-Riemannian Seminar Università di Padova.</li> <li>• 2021 - The Unity of Mathematics: A conference in honor of Sir Michael Atiyah Isaac Newton Institute.</li> <li>• 2019 - Recent Developments in Microlocal Analysis MSRI, UC Berkeley.</li> </ul>
<b>Collaborative Visits</b>	<ul style="list-style-type: none"> <li>• April 2023 - Centro di Ricerca Matematica Enno de Giorgi. Witi Veronique Fischer, Francesca Tripaldi and Fulvio Ricci to meet Sundaram Thangavelu. 3 days.</li> <li>• March 2023 - University in Paris - Sorbonne Université, to meet Lino Benedetto and the research group of Emmanuel Trélat. 2 days.</li> <li>• January 2023 - Université d'Angers. With Clotilde Fermanian-Kemmerer and Veronique Fischer - 4 days.</li> <li>• May 2022 - Institut Henri Poincaré. With Clotilde Fermanian-Kammerer. 4 days</li> <li>• November 2021 - Institut Henri Poincaré. With Clotilde Fermanian-Kammerer. 2 weeks</li> </ul>
<b>Relevant Skills</b>	Software Experience: LaTeX, Python, C++, MATLAB, Git.