

CV - Jeremy B. Hume

Email: jeremybhume@gmail.com

Nationality: Canadian, Age: 26

Education

PhD, Mathematics *September 2021 - Present*
(Defending Summer 2024)
University of Glasgow (Supervisor: Xin Li)

MSc, Mathematics *September 2019 - August 2021*
University of Victoria (Supervisor: Ian F. Putnam)

H.BSc, Mathematics *September 2015 - May 2019*
University of Toronto

Research Interests

C^* -algebras, K -theory, groupoids and dynamical systems.

Recent Projects

KK -duality for self-similar groupoid actions on graphs

arxiv:2302.03989 (submitted). Joint with N. Brownlowe, A. Buss, D. Gonçalves, A. Sims and M. F. Whittaker. We prove that two naturally associated C^* -algebras to a regular and contracting self-similar groupoid are Spanier-Whitehead dual (in KK -theory) to each other by showing they are strongly Morita equivalent to the stable and unstable Ruelle C^* -algebras of a Smale space arising from the self-similar limit space.

The K -theory of the C^* -algebras associated to a rational function

arxiv:2307.13420 (submitted). We compute the K -theory of the three C^* -algebras associated to a rational function, thought of as a dynamical system acting on its Julia set, Fatou set or the entire Riemann sphere. Our results yield new dynamical invariants for rational functions and a C^* -algebraic formulation of the Density of Hyperbolicity Conjecture for quadratic polynomials.

Renormalization procedures for C^* -algebras

(MSc. Thesis) (<http://hdl.handle.net/1828/13285>). We introduce renormalization procedures for C^* -algebras, in analogy to renormalization procedures for families of dynamical systems. We prove a C^* -analog to Masur's unique ergodicity criterion for flat surfaces and apply this criterion to show a variety of C^* -algebras have unique trace.

Dynamical covers

(In preparation). Joint with Kevin Brix and Xin Li. To a non-invertible dynamical system we construct two covers of it by better behaved systems, generalizing the Krieger and Fischer covers of a sub-shift. We show these covers are functorial, have universal properties and study the relationship between properties of the original system and properties of the cover.

Recent Invited and Contributed Talks

NSeaG24, Odense, Denmark *August 2024*
(Invited talk: TBA)

YMC*A 2023, Leuven, Belgium *August 2023*
(Contributed talk: The K -theory of a rational function)

Algebra, Geometry and C^* -algebras, ICMS, Edinburgh, Scotland *June 2023*
(Invited talk: The K -theory of a rational function)

Analysis seminar University of Waterloo, Canada *January 2023*
(Invited talk: The K -theory of a rational function)

Organizing

Analysis working seminar, University of Glasgow, Scotland *September 2022 - April 2023*
I organized with two fellow PhD students a weekly seminar for members of the analysis department and visiting scholars to present topics related to their research.

YMC*A 2024, University of Glasgow *August 2024*
I am leading the organizing committee for "Young Mathematicians in C^* -algebras", which is an international conference designed for early career researchers working in the field of operator algebras. Expected number of participants is 150.

Teaching

Complex analysis tutorial, University of Glasgow *Winter 2021*
I led the 4th year honours complex analysis tutorial where I taught supplemental material and went through problem set exercises carefully with students.

Teichmüller theory seminar, University of Victoria, Canada *Fall 2019*
I hosted a Teichmüller theory seminar at the University of Victoria and gave two one-hour lectures each week.

Calculus, Toronto, Canada *July 2019*
I taught an approximately 100-hour-long course on high-school level calculus to an individual through Forest Hill Tutoring Company in Toronto.

Awards and Scholarships

University of Glasgow Graduate Scholarship¹ £60 000 GBP	<i>2021</i>
British Columbia Graduate Scholarship \$15 000 CAD	<i>2019</i>
University of Victoria Graduate Award \$4872 CAD	<i>2019</i>
Margaret Ronald Taylor & Thomas Paxton Taylor Scholarship \$1414 CAD	<i>2019</i>
Dean's List (University of Toronto)	<i>2016, 2017, 2018</i>
F Ray Irwin Scholarship \$1000 CAD	<i>2018</i>
Regents In-Course Scholarship \$1000 CAD	<i>2017</i>
Dr John Benjamin Gullen Scholarship \$1000 CAD	<i>2016</i>
President's Entrance Scholarship \$2000 CAD	<i>2015</i>

¹(funded through ERC grant No. 817597)