James Eldred Pascoe

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Positions

National Science Foundation Mathematical Sciences Postdoctoral Research Fellow, Washington University in St. Louis (Fall 2016 - Present)

William Chauvenet Postdoctoral Lecturer, Washington University in St. Louis (Fall 2015 - Present)

Education

Ph.D. Mathematics, University of California, San Diego, 2015.

Advisor: Jim Agler.

Committee: Jim Agler, Adrian Ioana, Bill Helton, Bob Bitmead, William McEneaney.

M.A Applied Mathematics, University of California, San Diego, Fall 2011

B.S. Mathematics, minor in English, University of North Texas, Spring 2010.

Grants

National Science Foundation Mathematical Sciences Postdoctoral Research Fellow (2016-2019) ($150,000 USD)

Fields of Research Interest

Functional Analysis, matrix inequalities, moment problems, several complex variables, noncommutative function theory, multivariable operator theory, real algebraic geometry, and free probability.

Research

Journal Articles

1. David Cushing, J. E. Pascoe, Ryan Tully-Doyle. Free functions with symmetry. *Math. Z.*, to appear.
2. John McCarthy, J. E. Pascoe. A non-commutative Julia Inequality. *Math. Ann.*, to appear.
3. Kelly Bickel, J. E. Pascoe, Alan Sola. Derivatives of rational inner functions: geometry of singularities and integrability at the boundary. *Proc. Lond. Math. Soc.*, to appear.
4. J. E. Pascoe. A wedge-of-the-edge theorem: analytic continuation of multivariable Pick functions in and around the boundary. *Bull. Lond. Math. Soc.*, to appear.
5. J. E. Pascoe. Positivstellensatze for noncommutative rational expressions. *Proc. Amer. Math. Soc.*, to appear.
6. J. E. Pascoe. An inductive Julia-Caratheodory theorem for Pick functions in two variables. *Proc. Edin. Math. Soc.*, to appear.
7. J. E. Pascoe, Ryan Tully-Doyle. Free Pick functions: representations, asymptotic behavior and matrix monotonicity in several noncommuting variables. *J. Funct. Anal.*, 273 (1) 283-328 (2017)

8. John McCarthy, J. E. Pascoe. The Julia-Caratheodory theorem on the bidisk revisited. *Acta Sci. Math. (Szeged)*, 83:1-2, 165-175, 2017
9. Igor Klep, J. E. Pascoe, Jurij Volcic. Regular and positive noncommutative rational functions. *J. Lond. Math. Soc.*, 95 (2) 613-632, 2017
10. J. William Helton, J. E. Pascoe, Ryan Tully-Doyle, Victor Vinnikov. Convex entire noncommutative functions are polynomials of degree two or less. *Integral Equations Operator Theory*, 86 (2), 151-163, 2016.
11. J. E. Pascoe. The inverse function theorem and the Jacobian conjecture for free analysis. *Math. Z.*, 278 (3-4) 987-994, 2014.

Submitted Preprints

1. J. E. Pascoe. The wedge-of-the-edge theorem: edge-of-the-wedge type phenomenon within the common real boundary.
2. J. E. Pascoe. The noncommutative Löwner theorem for matrix monotone functions over operator systems.
3. J. E. Pascoe. Note on Löwner's theorem on matrix monotone functions in several commuting variables of Agler, McCarthy and Young.
4. J. E. Pascoe, Ryan Tully-Doyle. Cauchy transforms arising from homomorphic conditional expectations parametrize free Pick functions but those arising from conditional expectations do not.
5. Benjamin Passer, J. E. Pascoe, Ryan Tully-Doyle. Representation of free Herglotz functions.

Presentations

Colloquia and lecture series

1. "Real algebraic geometry and matrix inequalities." Distinguished Visiting Professor Lecture Series, Bucknell, October 2017.
2. "Free functions with Symmetry." Colloquium, University of Florida, Fall 2016.

Long invited conference talks

1. "Noncommutative Positivstellensatze." Wabash Miniconference, September 2017.
2. "Regular and positive noncommutative rational functions." Iowa 2016 Workshop on Noncommutative Analysis.
3. "Matrix monotonicity in several variables." Southeastern Analysis Meeting (SEAM) 2016.
4. "Monotonicity in free analysis." JMM 2016, Special Session on Advances in Free Analysis: the Theory and Applications of Noncommutative Functions, Inequalities, and Domains.
5. "Representation formulas for Pick functions in two complex variables and free function theory." Free Stochastic Analysis Mini-Workshop, Saarbrucken.

Further invited conference talks

1. "Applications of model- realization theory to inverse problems in free probability." Mathematical Congress of the Americas, 2017, Special Session on Free Probability and its applications.
2. "Applications of model- realization theory to inverse problems in free probability." JMM 2017, Special Session on Operator Theory, Function Theory and Models.

3. “Matrix monotonicity in several variables." International Workshop on Operator Theory and Applications (IWOTA) 2016 in Noncommutative Inequalities Special Session.
4. “Matrix monotonicity in several variables." Matrix Theory and Network Systems (MTNS) 2016 in Problems in Matrix and Operator Variables Special Session.
5. “Free functions with Symmetry." San Antonio, JMM 2015, Special Session on Noncommutative function theory.
6. “Using operator theory to measure the asymptotic behavior of Pick functions in two variables at infinity." San Antonio, JMM 2015, Special Session on Multivariable Operator Theory.
7. “A wedge of the edge of the wedge." ICMS Workshop 2014: Function theory in several complex variables in relation to modelling uncertainty.
8. “Matrix monotonicity in several noncommuting variables." JMM 2014, Special Session on Multivariable Operator Theory.
9. “Matrix monotonicity in several noncommuting variables." St. Louis AMS Sectional Meeting, Fall 2013, Special Session on Multivariable Operator Theory.

Invited seminar talks

1. “Geometric aspects of rational inner function membership in function spaces." Linear Analysis seminar TAMU Spring 2017.
2. “The Julia-Caratheodory theorem on the bidisk and the bi-upper half plane." Seminar at University of Auckland, February 2017.
3. “The Julia-Caratheodory theorem on the bidisk." Seminar, University of Florida, Fall 2016.
4. “Matrix monotone functions in one and several variables." TAMU Linear Analysis Seminar, October 24, 2014.

Other talks

1. “Positivstellensätze for noncommutative rational functions." Sums of Squares: Real Algebraic Geometry and its Applications, Innsbruck, August 2017.
2. “Geometric aspects of rational inner function membership in function spaces." WashU Analysis Seminar Spring 2017.
3. “Positive noncommutative rational functions." Analysis Seminar WashU Spring 2016.
4. “Hankel Vector Moment Sequences." Analysis Seminar WashU Fall 2015.
5. “Hankel vector moment sequences." GPOTS 2014.
6. “Injective free polynomials." Hilbert Function Spaces 2013.
7. “Boundary approximation and interpolation of Pick functions." Advancement to Candidacy 2013.
8. “The Pick problem." Food for Thought (Graduate student seminar) 2013.
9. “The Hamburger moment problem." Food for Thought (Graduate student seminar) 2012.

Other Awards

Mathematisches Forschungsinstitut Oberwolfach Leibniz Graduate Student, Workshop: Structured Function Systems and Applications, 2013

Graduate Assistant in Areas of National Need Fellow 2010-2012

Teaching Experience

Washington University in St. Louis

Introduction to Mathematical Reasoning, Spring 2018 (Tentative).

Mathematics for the Physical Sciences, Spring 2016.

Elementary Probability and Statistics Fall 2015.

Other work experience

University of California, San Diego.

Graduate Research Assistant for Jim Agler, Summers 2012, 2013, 2014, Fall-Spring 2015.

Graduate Research Assistant for Bill Helton, Summer 2011.

Teaching assistant for various classes including: Calculus, Complex analysis, Real analysis, Introduction to Proof.

University of North Texas, Denton. Grader and Mathlab tutor. Fall 2008- Spring 2010.

Apprentice Landman / Land Title Researcher, Ardmore, OK, Summer 2007.

Professional Activities

Departmental service: Organized Free Analysis Seminars at UCSD 2012 - 2015.

Longer Visits

University of Ljubljana, Slovenia, August 2017 (2 weeks)

Texas A&M University, April 2017 (1 month)

University of Auckland, January-February 2017 (6 weeks)

University of Florida, October-November 2016 (1 month)

University of Auckland, December 2015. (1 month)

Miscellaneous

Programming Languages: Working knowledge of Java, C, C++, JavaScript, Mathematica, HTML.