

Contact Information

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Employment

10.2017–present Senior lecturer in pure mathematics, Imperial College London, UK
 05.2015–04.2020 *EPSRC Early Career Fellow*, UK
 05.2013–04.2015 *Chapman Research Fellow*, Imperial College London, UK
 09.2009–04.2013 Research Fellow (Marie-Curie and Leverhulme Trust), Uni. of Warwick, UK

Education

08.2004–08.2009 PhD in Mathematics, Stony Brook University, New York, USA
 08.2002–06.2004 MSc in Mathematics, Sharif University of Technology, Tehran, Iran
 08.1998–06.2002 BSc in Mathematics, Sharif University of Technology, Tehran, Iran

Research interests

- Low-dimensional analytic dynamics (moduli spaces, rigidity, and small divisors)
- Analysis (renormalization operators on function-spaces)
- Geometric analysis (quasi-conformal Teichmüller theory and elliptic PDEs in the plane)

Fellowships/Grants/Awards/Honours

- Faculty of Natural Sciences award for Excellence in Teaching, Imperial College, 2018.
- H2020 Marie-Curie postdoctoral fellowship to host Fabrizio Bianchi, 183,454.80 EUR, 2018-2020.
- London Math Society Scheme III grants, 4,000 GBP, August 2017.
- European Partners Fund, 5000 GBP, Imperial College London, 2017.
- Poste Rouge au CNRS (3-month fellowship to visit IMJ-PRG), 2017
- EPSRC EC Fellowship, 793,076 GBP, (=80% EPSRC + 20% Imperial College), 2015 – 2020.
- Department platform grant, 8000 GBP, Imperial College, 2016.
- Leverhulme Trust EC Fellowship; 97,602 GBP, May 2011–April 2013.
- London Math Society Scheme III grants, 1,669 GBP, April 2015
- Roberts' Fund (travel grant to host Y. Okuyama); 1,000 GBP, University of Warwick, Nov 2011.
- Fields Institute Fellowship; 5,000 CAD, Toronto, Canada, 2005.
- President's award for excellence in the class of 2004 (ranked 1st), Sharif University of Technology.

Organization of international conferences, workshops, and research seminars

- Conference on analysis aspects of dynamics, 60 participants, [organised with V. Markovic and T. Sahsten], Imperial College, 16-18 May 2018.
- Conference on parameter problems in analytic dynamics, 104 participants, [organized with T. Clark], Imperial College, Jun 27 - Jul 1, 2016.
- Conference on renormalization in low-dimensional dynamics and its applications, 60 participants, [organized with S. van Strien and H. Bruin], University of Warwick, Dec 13-17, 2010.
- Conference on dynamics of rational maps on the Riemann sphere, 35 participants, [organized with S. van Strien], University of Warwick, Mar 22-24, 2010.
- One-day function theory meeting, 42 participants, London Mathematical Society, Sept 7, 2015.

- LMS network meetings in holomorphic dynamics, 25 participants, Sept 8, 2015.
- Dynamics on the interface of real and complex one-dimension, 25 participants, [organized with S. van Strien), Imperial College London, Jan 13, 2014.
- An afternoon of complex dynamics, 20 participants, Imperial College London, Sept 3, 2013.
- Ergodic theory and dynamical systems weekly seminars, University of Warwick, 2011-2012, 2009-2010 (joint with C. Kalle).

Research presentations

Invited talks at international conferences, workshops, and colloquia (selected)

- La réunion finale du projet LAMBDA, 28 May-1 June, 2018.
- Mathematics Colloquium, Swansea University, Dec 2017.
- Journées de dynamique, Paris, Oct 2017.
- New trends in one dimensional dynamics, celebrating Welington de Melo's 70th birthday, IMPA, Rio de Janeiro, Nov 14–18, 2016.
- Analysis and dynamics, Banf international research station at Oaxaca, Sept 18-23, 2016.
- Topics in analysis and holomorphic dynamics, four lectures, Warsaw, Sept 15–19, 2015.
- ACCA-UK/JP First International Workshop, Mar 12-13, 2015.
- 3rd frontiers in mathematical sciences, Tehran, Iran, Dec 29 – Jan 1, 2014.
- Maps with an indifferent fixed point, Nanjing, China, May 26–30, 2014.
- Low dimensional dynamics, IMPA, Brazil, Nov 17–22, 2013.
- Topological and combinatorial problems in 1-D complex dynamics, Pisa, Nov 12–18, 2013.
- Geometric function theory meeting, LMS, Sept 2, 2013.
- Non-uniformly hyperbolic and neutral one-dimensional dynamics, Singapore, Apr 23–27, 2012.
- International summer school on dynamical systems, Göttingen, Germany, Aug 6–13, 2011.
- Renormalization in low dimensional dynamics and its applications, two lectures, University of Warwick, UK, Dec 13–17, 2010.
- Low dimensional dynamics, Polish academy of sciences, Nov 15–20, 2010.
- Holomorphic dynamics around Thurston's Theorem, Copenhagen, Sept 27–30, 2010.
- Conformal methods in analysis and dynamics, France, May 2–8, 2010.
- Fall school in holomorphic dynamics, University of Barcelona, Spain, Nov 30–Dec 4, 2009.

Invited talks at one-day meetings and research seminars (selected)

- Séminaire Géométrie Topologie Dynamique, Orsay, Feb 2018.
- Séminaire de Théorie Ergodique et Systèmes Dynamiques, Paris 13, Feb 2018.
- Séminaire de Systèmes Dynamiques, IMJ-PRG, Feb 2018.
- Séminaire de Théorie Ergodique, IMJ-PRG, Jan 2018.
- Séminaire de Systèmes Dynamiques, University of Orléan, Jan 2018.
- Analysis and geometry seminar, Queen Mary University London, Dec 2017.
- Analysis and dynamics seminar, University of Manchester, Nov 29, 2016.
- LMS meeting on holomorphic dynamics, University of Liverpool, May 10, 2016.
- Pure analysis and PDE seminar, Imperial College London, May 6, 2016.
- Ergodic theory and dynamical systems seminar, University of Warwick, UK, Apr 2015.
- Applied and computational complex analysis, Imperial College London,
- London geometry and topology seminar, Imperial College London, UK, Mar 2015.
- London analysis and probability seminar, Imperial College London, UK, Feb 2015.
- Dynamics and geometry seminar, University of Liverpool, UK, Mar 2014.
- Dynamical systems seminar, Imperial College London, Jan 2014.
- Applied math and mathematical physics, Imperial College London, Oct 8, 2013.
- Dynamics and analysis seminar, University of Barcelona, Spain, Mar 2013.
- Analysis seminar, University of Jyväskylä, Finland, Feb 2013.

- Dynamics and geometry seminar, University of Bristol, Bristol, UK, Jan 2013.
- Dynamics seminar, Kyoto University, Japan, Jul 2012.
- Analysis and geometry seminar, Nagoya University, Japan, Jul 2012.
- Dynamics seminar, Imperial College London, UK, Feb 2012.
- Dynamical systems and ergodic theory seminar, University of Warwick, UK, Jan 2012.
- Analysis and geometry seminar, Universität zu Kiel, Germany, Jul 2011.
- Dynamics and geometry seminar, Université Paul Sabatier, Toulouse III, France, Jun 2011.
- Dynamics and geometry seminar, University of Liverpool, UK, Apr 2010.
- Dynamics and geometry seminar, Jacobs University Bremen, Germany, Oct 2009.
- Ergodic theory and dynamical systems seminar, University of Warwick, UK, Oct 2009.
- Dynamics and geometry seminar, University of Liverpool, UK, Oct 2009.
- Dynamical systems seminar, Stony Brook University, USA, Oct 2008.
- Dynamical systems seminar, Stony Brook University, USA, Mar 2007.
- Dynamical systems seminar, Fields Institute, Toronto, Canada, May 2006.

Teaching experiences (selected)

- Lecturer, real analysis, 2nd year undergraduate course, IC, Autumn 2017.
- Lecturer, geometric complex analysis, 3rd/4th year course, IC, Autumn 2016.
- Lecturer, five-lectures on dynamical systems, MPE CDT, IC, Autumn 2015, and Autumn 2016.
- Lecturer, analytic number theory, 3rd/4th year course, Imperial College London, Spring 2016.
- Lecturer, one dimensional real and complex dynamics, Taught Course Centre (TCC); video broadcast to the universities of Bath, Bristol, Imperial College, Oxford, Warwick, Spring 2014.
- Lecturer, dynamical systems, 4th year/MSc course, University of Warwick, Autumn 2011.
- Lecturer, dynamical systems, 4th year/MSc course, University of Warwick, Autumn 2010.
- Lecturer, introduction to PDE's, (Summer 2009), Stony Brook University.
- Lecturer, Calculus B (Spring 2007), Calculus A (Spring 2008), Calculus C (Spring 2009), Stony Brook University.

Mentoring and supervision (selected)

- Alexandre de Zotti, research associate (postdoc), Nov 2016 - Nov 2019.
- Fabrizio Bianchi, Chapman research fellow (postdoc), Oct 2016 - Oct 2018.
- Iliés Zidane, PhD student, Imperial College and Toulouse (joint with A. Cheritat), 2012-17.
- Mohammad Pedramfar, PhD student, Imperial College, since Jan 2016.
- Christodoulos Savva, MRes project, MPE CDT (joint with G. Rooney, MET office), 2016-2017.
- Albert Wood, MRes project, LSGNT (joint with A. Granville, UCL), 2016-2017.
- Lin Fan, MSc student, Imperial College London, 2016-2017.
- Thordis Thorsteins, MSc student, Imperial College London, 2016-2017.
- William Downham, year-4 student, Imperial College London, 2016-2017.
- Timothy Westwood, year-4 student, Imperial College London, 2014-2015.
- Aleksandar Panayotov, MSc student, Imperial College London, 2013-2014.
- Ruolan Chi, MSc student, University of Warwick, 2012-2014.
- Stephen Luke, MSc student, University of Warwick, 2012-2013.
- Martin Rixham, MSc student, University of Warwick, 2012-2013.
- Mikk Tonissoo, MSc student, University of Warwick, 2012-2013.

Membership of professional bodies and learned societies

- EPSRC College, 2015 - present,
- American Mathematical Society, 2004 - 2016
- London Math Society, 2017 - present

Research visits

- Institut Math Jussieu, three month visit, 2017-2018.
- IMPA (Brasil), visiting Artur Avila for ten days, Nov 2015.
- Stefan Banach center, Poland, one month visit to deliver 8 lectures on my work on satellite renormalization, Sept 2015.
- IMPA (Brasil), visiting Artur Avila for two weeks, Nov 2013.
- Toulouse (France), visiting Xavier Buff and Arnaud Cheritat for one week, April 2013.
- University of Jyvaskyla (Finland), visiting Pekka Koskela for one week, Feb 2013.
- Universität zu Kiel (Germany), visiting Walter Bergweiler for one week, Jul 2011.
- Kyoto University, visiting Mitsuhiro Shishikura for two weeks, Jul 2012.
- Toulouse, visiting Xavier Buff and Arnaud Cheritat for 4 month, Feb–Apr 2011.
- One-year program on renormalization, holomorphic dynamics, and hyperbolic geometry, Fields Institute, Toronto, Canada, Sept 2005–May 2006.
- Advanced school in basic algebraic geometry, three-weeks program, ICTP, Italy, July 2003.

Refereed Journal papers:

- 1) Combinatorial rigidity for some infinitely renormalizable unicritical polynomials, **Conform. Geom. Dyn.** **14** (2010), 219-255. (37 pages).
- 2) Typical orbits of quadratic polynomials with a neutral fixed point: Brjuno type, **Commun. Math. Phys.** **322**, issue 3, (2013), pp 999-1035. (37 pages).
- 3) A proof of the Marmi-Moussa-Yoccoz conjecture for rotation numbers of high type, [with A. Chéritat] **Inventiones Mathematicae**, Vol 202, No 2, pp 677-742, 2015, (66 pages).
- 4) Typical orbits of quadratic polynomials with a neutral fixed point: non-Brjuno type, **Ann. Sci. École Norm. Sup.**, in Press 2017 (82 pages).
- 5) Statistical properties of quadratic polynomials with a neutral fixed point, [with A. Avila] **Journal of the European Mathematical Society**, in press 2017, (61 pages).

Journal article preprints:

- 6) Satellite renormalization of complex quadratic polynomials, [with M. Shishikura]
Preprint: <https://arxiv.org/abs/1509.07843>
- 7) Topology of irrationally indifferent attractors,
Preprint: <https://arxiv.org/abs/1706.02678>

Journal articles in preparation:

- 8) Complex Feigenbaum phenomena of high type, [with M. Pedramfar].
- 9) Semi-local dynamics near Siegel disks with a critical point on the boundary.
- 10) Combinatorial-analytic multipliers and the asymptotic geometry of the Mandelbrot set.
- 11) Measurable dynamics of holomorphic maps with a non-linearizable fixed points.
- 12) Topology of isentropes in a two parameter family of unimodal maps, [with S. van Strien].

Book chapter:

- 13) Mathematics of Planet Earth, a primer; chapter on dynamical systems, (56 pages), [joint with T. Kuna]
In press: Advanced textbooks in mathematics, World Scientific.

Projects in progress:

- Endomorphisms of \mathbb{C}^2 with a wandering domain converging to a Cantor set, [with F. Bianchi, T. Clark, and S. van Strien]
- Siegel disks with boundaries of Hausdorff dimension two, [with A. de Zotti]
- Centralizers at irrationally indifferent fixed points, [with A. Avila and R. Perez-Marco]
- Primitive renormalizations near parabolic maps, [with M. Shishikura]
- Unique ergodicity of hedgehog dynamics, [with Xavier Buff]