DAVID KELLY

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last updated 11/15/2015.

Born 6 January 1987, Sydney, Australia.

Employment

- **New York University, Courant Institute of Mathematics Sciences**—(2014-Present)
  Courant Instructor / Assistant Professor
- **University of North Carolina, Chapel Hill**—Oct 2013 - Sept 2014
  Research Fellow (Superior: Chris Jones)
- **University of Warwick**—Oct 2012 - Sept 2013
  Research Fellow (Superior: Andrew Stuart)

Education

- **University of Warwick**—Ph.D (Research). 2009-13 (submitted Sept 2012).
  ***Advisor**: Martin Hairer. **Thesis**: Itô corrections in stochastic equations.*
- **University of Sydney**—M.Sc (Research). 2008-09.
  ***Advisor**: Georg Gottwald. **Thesis**: On the topology of synchrony optimal networks.*
- **University of Sydney**—B.Sc (Hons, Adv. Math.). 2005-08
  ***Grade**: First Class Honours with University Medal.*

Publications and Preprints

11. *Fluctuations in the heterogeneous multiscale methods for fast-slow systems.* Joint work with Eric Vanden-Eijnden. Submitted to **Res. Math. Sci.** (2015)
10. *Concrete ensemble Kalman filters with rigorous catastrophic filter divergence.* Joint work with Andy Majda, Xin Tong. **Proc. Natl. Acad. Sci.**. 112 (2015) no. 34 10589-10594
9. *Nonlinear stability of the ensemble Kalman filter with adaptive covariance inflation*. Joint work with Andy Majda, Xin Tong. To appear in **Comm. Math. Sci**. (Accepted 2015).
8. *Nonlinear stability and ergodicity of ensemble based Kalman filters.* Joint work with Andy Majda, Xin Tong. Submitted to **Nonlinearity**. (2015)
7. *Deterministic homogenization of fast-slow systems with chaotic noise.* Joint work with Ian Melbourne. Submitted to **Journal of Functional Analysis**. (2015)
6. *Smooth approximations of stochastic differential equations*. Joint work with Ian Melbourne. To appear in **Annals of Probability** (Accepted 2015).
5. *Rough path recursions and diffusion approximations*. To appear in **Annals of Applied Probability**. (Accepted 2015)
4. *Well-Posedness And Accuracy Of The Ensemble Kalman Filter In Discrete And Continuous Time*. Joint work with Kody Law and Andrew Stuart. **Nonlinearity** 27 (2014), no. 10, 2579.

3. *Geometric vs Non-geometric rough paths*. Joint work with Martin Hairer. **Annales de l'IHP (B)** 51 (2015), no. 1, pp. 207-251.
2. *Stochastic PDEs with multiscale structure*. Joint work with Martin Hairer. **Electronic Journal of Probability** 17 (2012).
1. *On the topology of synchrony optimized networks*. Joint work with Georg Gottwald. **Chaos** 21 (2011).

Theses

2. *Itô corrections in stochastic equations*. Ph.D thesis, University of Warwick (2013).
1. *On the topology of synchrony optimized networks*. M.Sc thesis, University of Sydney (2009).

Grants awarded

- AMS-Simons travel grant. 2015-2017 ($4k)

Professional visits

- MSRI Research member. Fall 2015 program *New Challenges in PDE: Deterministic Dynamics and Randomness in High and Infinite Dimensional Systems*.

Lecturing

- New York University: Calc II (Fall 2014), Linear algebra (Spring 2015, Fall 2015), Numerical Analysis (Spring 2016).

Mini-courses delivered

- Schrödinger institute, Austria : Homogenization and rough path theory. Expected May 2016.
- University of Sao Carlos, Brazil : Short course on rough paths (6 lectures), September 2015.
- Tata institute of fundamental research, Bangalore, India : Data assimilation (5 lectures). March 2013.

Students mentored

- New York University undergraduate summer projects - Ryan Saxe (2015): *Forecasting methods based on Taken's theorem*.

Scholarships and Prizes

- University of Warwick: Warwick Postgraduate Research Scholarship (Chancellor's Scholarship) (2009-2012).
- University of Sydney: Australian Postgraduate Award (2009), University Medal (2008), Honours Scholarship (2008), Dean's Merit Award (2007), George Allen Scholarship (2007), K.E. Bullen Scholarship (2007), Dean's Honour Roll (2005-2007).

Academic Referee Experience

- Refereed articles for Annales de l'IHP (B), Comm. Math. Sci., Electronic Comm. in Probability, Probability theory and related fields, Journal of Nonlinear Science, Journal of Mathematical Analysis and Applications and written reviews for Mathscinet.

Colloquia delivered

- Fast-slow systems with chaotic noise. Math colloquium, Penn state, March 2015
- Fast-slow systems with chaotic noise. Math colloquium, U of Minn, November 2014

Seminar / Conference / Workshop talks delivered

- Data assimilation for high dimensional nonlinear forecast problems. New challenges in PDE workshop, MSRI, Berkeley, Oct 2015
- Fast-slow systems with chaotic noise. Applied analysis and computation seminar, UMass, Amherst, September 2015
- Stability of the ensemble Kalman filter. Equadiff 2015, Lyon, France, July 2015
- Fast-slow systems with chaotic noise. Homogenization workshop, Luminy, France, May 2015
- Fast-slow systems with chaotic noise. Math finance, PDE, stochastics seminar, Rutgers, April 2015
- Fast-slow systems with chaotic noise. BU/Brown seminar, Brown, March 2015
- What do we know about EnKF? CAOS colloquium, Courant, March 2015
- Fast-slow systems with chaotic noise. Probability seminar, Columbia, February 2015
- EnKF and filter divergence. Math seminar, NIST, December 2014
- Fast-slow systems with chaotic noise. Applied math seminar, CIMS, NYU, October 2014.
- Fast-slow systems with chaotic noise. Applied math and PDE seminar, Drexel, October 2014.
- Fast-slow systems with chaotic noise. Courant instructor day, CIMS, Oct 2014.
- SPDE graduate school, MSRI, Berkeley, July 2014. *Support classes and problem sessions.*
- SIAM UQ 2014, Savannah Hyatt, May 2014. *EnKF and catastrophic filter divergence*
- Model-Data workshop, Newton institute, Cambridge, March 2014. *EnKF and catastrophic filter divergence*
- Probability seminar, Université Paris Dauphine, Paris, March 2014. *Fast slow systems with chaotic noise.*
- Probability seminar, Warwick, March 2014. *Fast slow systems with chaotic noise.*
- Rough path theory workshop, IPAM, UCLA, February 2014. *Fast slow systems with chaotic noise.*
- MURI Workshop, Courant Institute, NYU, January 2014. *EnKF and catastrophic filter divergence*
- Predictability of Earth System Processes, IMA, University of Minnesota, November 2013. *EnKF and catastrophic filter divergence*

- Data Assimilation Day, UNC Chapel Hill, November 2013. *EnKF and catastrophic filter divergence*
- Duke-UNC probability seminar, October 2013. *Homogenisation for multidimensional fast-slow systems*
- XVIIth Brazilian school of Probability, Rio de Janeiro, August 2013. *Homogenisation for multidimensional fast-slow systems*
- XVIIth Brazilian school of Probability, Rio de Janeiro, August 2013. *Exercise classes for M. Hairer's short course on regularity structures.*
- Data Assimilation Workshop, University of Maryland, June 2013. *Catastrophic filter divergence and EnKF*.
- Group seminar, University of North Carolina, June 2013. *Catastrophic filter divergence and EnKF*.
- Data Assimilation Workshop, University of Maryland, June 2013.*Catastrophic filter divergence and EnKF*
- Algebra and Combinatorics seminar, ICMAT (Madrid), April 2013.*An algebraic framework for Itô's formula*.
- Stochastic Analysis seminar, University of Oxford, April 2013. *Itô's formula via rough paths.*
- Short course on Data Assimilation, TIFR Bangalore, March 2013.
- Dynamical systems seminar, University of Sydney, January 2013.*Homogenisation for multidimensional maps and flows.*
- SSSC 2012, ICMAT (Madrid), November 2012. *Geometric vs non-geometric rough paths.*
- Data Assimilation 2012, University of Oxford, September 2012. *Geometric vs non-geometric rough paths.*
- East Midlands stochastic analysis seminar, University of York, July 2012. *Geometric vs non-geometric rough paths.*
- Multiscale systems, University of Warwick, Dec 2011.
- UK-China workshop, Loughborough University, July 2011.