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 Email: Kei-Fong.Lam@mathematik.uni-regensburg.de
- EMPLOYMENT** Sep 2014–present: Post-doctoral position at **Universität Regensburg** in the group of Prof. Dr. Harald Garcke and a member of the DFG Priority Programme 1506: Transport Processes at Fluidic Interfaces
- EDUCATION** **University of Warwick**, Coventry, U.K.
- Ph.D. in Mathematics, Sep 2011 - Jul 2014
- funded by EPSRC Grant EP/H023364/1 as part of the MASDOC CDT programme
  - Thesis title: *Diffuse interface modelling of soluble surfactants in two phase flow*
  - Advisors: Dr. Björn Stinner and Prof. Charles M. Elliott
- M.Sc. in Mathematics and Statistics, Class 1, Sep 2010 - Sep 2011
- funded by EPSRC Grant EP/H023364/1 as part of the MASDOC CDT programme
  - Thesis title: *Surface Allen–Cahn equation*
  - Advisors: Dr. Björn Stinner and Prof. Charles M. Elliott
- Master of Mathematics, Class 1, Sep 2006 - Jul 2010
- RESEARCH INTERESTS** Derivation of thermodynamically consistent **sharp interface** and **diffuse interface models** for soluble surfactants in two-phase fluid flow and for tumour growth. **Formal and rigorous analysis** of diffuse interface models and their sharp interface limits. Application of the phase field methodology to **approximating PDEs on complicated domains** and to **shape and topology optimisation** problems.
- PUBLICATIONS** **Articles in preparation**
1. H. Garcke and **K.F. Lam**. “Well-posedness of a Cahn–Hilliard system modelling tumour growth with chemotaxis and active transport.”
  2. H. Garcke and **K.F. Lam**. “Analysis of a Cahn–Hilliard system with non zero Dirichlet conditions modelling tumour growth with chemotaxis.”
  3. H. Garcke and **K.F. Lam**. “Global weak solutions and asymptotic limits of a Cahn–Hilliard–Darcy system with coupling source terms.”
- Articles under review**
1. H. Garcke, **K. F. Lam**, E. Sitka, and V. Styles. “A Cahn–Hilliard–Darcy model for tumour growth with chemotaxis and active transport.” arXiv:1508.00437, (2015).
  2. H. Garcke, C. Hecht, M. Hinze, C. Kahle, and **K.F. Lam**. “Shape optimization for surface functionals in Navier–Stokes flow using a phase field approach.” arXiv:1504.06402, (2015).
- Articles to appear**
1. H. Abels, **K.F. Lam**, and B. Stinner. “Analysis of the diffuse domain approach to a bulk-surface coupled PDE system.” *SIAM Journal of Mathematical Analysis*.

## Journal Articles

1. H. Garcke, **K.F. Lam**, and B. Stinner. “Diffuse interface modelling of soluble surfactants in two-phase flow.”  
*Communications in mathematical science*, 12(8):1475–1522, (2014).
2. C.E.A. Brett, **K.F. Lam**, K.J.H. Law, D.S. McCormick, M.R. Scott, and A.M. Stuart. “Accuracy and Stability of Filters for Dissipative PDEs.”  
*Physica D*, 245:34–45, (2013).

## Proceedings

1. H. Garcke, **K.F. Lam**, B. Stinner. “Phase-field modelling of two-phase flow with soluble surfactant.”  
in *Interfaces and Free Boundaries: Analysis, Control and Simulation, Oberwolfach Report*, doi: 10.4171/OWR/2013/15, (2013).

## Preprints, not submitted

1. C.E.A. Brett, **K.F. Lam**, K.J.H. Law, D.S. McCormick, M.R. Scott, and A.M. Stuart. “Stability of Filters for the Navier-Stokes Equation.”  
arXiv:1110.2527, (2012).

## RESEARCH ACTIVITIES

### 2015

- 21 - 25 Sep 2015: **(Talk)** Minisymposium on Mathematics of Fluid Interfaces, Jahrestagung der Deutschen Mathematiker-Vereinigung, Hamburg, Germany.
- 8 - 10 July 2015: **(Talk)** Minisymposium on Optimal Control on Multiphase Systems, SIAM Conference on Control and Its Applications (CT15), Paris, France.
- 24 - 30 May 2015: Oberwolfach seminar on Shapes and Patterns: Analysis and Simulation.

### 2014

- 23 - 27 Jun 2014: **(Talk)** International conference on free boundary problems: theory and applications, University of Cambridge.
- 28 May 2014: **(Poster)** 3rd SIAM national student chapter conference, University of Oxford.
- 9 Jan 2014: **(Poster)** Annual SIAM UKIE meeting, University College London.

### 2013

- 17 - 21 Jun 2013: **(Poster)** International conference on recent advances in PDEs and applications, Università degli Studi di Milano.
- 23 - 26 Apr 2013: **(Graduate exchange)** Project on “Analysis of a diffuse interface model for two-phase flow with surfactants”, Universität Regensburg.
- 24 - 30 Mar 2013: Oberwolfach workshop on Interface and Free boundaries: Analysis, Control and Simulation.

### 2012

- 18 May 2012: **(Talk)** 1st SIAM national student chapter conference, University of Manchester.
- 16 - 20 Apr 2012: 85th European Study Group with Industry (ESGI), University of East Anglia.
- 10 - 13 Apr 2012: OCCAM 4th UK Graduate Modelling Camp, University of Oxford.
- 12 - 16 Mar 2012: **(Graduate exchange)** Project on “Natural gradient flow discretisation of two-phase mean curvature flow”, Universität Bonn.

### 2011

- 27 Nov - 3 Dec 2011: Oberwolfach workshop on Geometric PDEs: Theory, Numerics and Applications.

- MASDOC Research study groups projects on Brain imaging and MRI (Oct - Dec 2010), and on Data assimilation (Jan - May 2011), University of Warwick.

TEACHING  
EXPERIENCE

Universität Regensburg, Regensburg, Germany

- **Teaching assistant** for seminar on nonlinear parabolic PDEs, WS 2014/15 and SS 2015.
- **Supervision of student research projects**, jointly with H. Garcke.

University of Warwick, Coventry, UK

- **Teaching assistant** for undergraduate modules in analysis and continuum mechanics, Oct 2012 - Mar 2014.
- **Supervisor** of first and second year undergraduate students in groups of four or five, Oct 2010 - May 2013.

ACADEMIC  
SERVICE

- Referee for: Journal of Nonlinear Analysis Series B: Real World Applications.
- Treasurer (2011 - 2012) and President (2012 - 2013) of the Warwick SIAM student chapter. Organisation of the 2nd SIAM National Student Chapter Conference in the University of Warwick (10th May 2013) and the Warwick SIAM talks with industry (Feb - Nov 2013).

SKILLS

**Postgraduate certificate in Transferable skills in Science**

- Team working in a research environment
- Science communication to different audiences
- Decision making and leadership

**Languages:** Cantonese (first), English, Mandarin, German (A2.2).

**Programming:** Experience of solving PDEs in MATLAB via finite difference and finite element methods.

REFERENCES

**Prof. Dr. Harald Garcke** (post-doc advisor)  
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