

Heiko Enderling, Ph.D. – Assistant Professor of Medicine – Curriculum Vitae

Center of Cancer Systems Biology, CBR 119
Caritas St. Elizabeth's Medical Center
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Education

- Ph.D. in Mathematical Biology, Division of Mathematics, University of Dundee, 2006
Dissertation: '*Mathematical modelling of breast tumour development, treatment and recurrence*'
Advisor: Prof Mark AJ Chaplain, Dr Alexander RA Anderson, Dr Glenn W Rowe
- Diplom-Ingenieur for Computer Visualization, School of Computer Sciences, University of Magdeburg, Germany 2003
Dissertation: '*Automated tracking of moving cells in vitro using a modified SuperCorrelation algorithm*'
Advisor: Prof Dr Klaus D Toennies, Dr Walter Schubert

Positions Held

- 2010 – date: Associate Investigator, Caritas St. Elizabeth's Medical Center;
Assistant Professor, Tufts University School of Medicine
- 2009 – 2010: Senior Research Associate, Caritas St. Elizabeth's Medical Center;
Instructor, Tufts University School of Medicine
- 2007 – 2008: Research Associate, Caritas St. Elizabeth's Medical Center;
Postdoctoral fellow, Tufts University School of Medicine
- 2006: Postdoctoral researcher, University of Dundee Divisions of Mathematics and Surgery and Molecular Oncology
- 2005 – 2006: ICS (Information & Communication Services) HelpDesk Officer, Dundee, UK
- 2004 – 2006: Teaching assistant, University of Dundee, UK
- 1999 – 2003: Software Engineer (part time), MelTec GmbH, Magdeburg, Germany

Awards and Fellowships

- 2003-2006: Dundee University Nicholl-Lindsay PhD Scholarship
- 2005: Cancer Research UK Pilot Project Research Award
- 2007: British Oncology Association Young Investigator Award
- 2008-2011: American Association for Cancer Research Centennial Postdoctoral Fellowship

Professional Affiliations

- American Association for Cancer Research
- Radiation Research Society
- Society for Mathematical Biology
- European Society for Mathematical and Theoretical Biology

Research Interests

- Mathematical modelling of tumour initiation, development and growth in irregular domains, radiotherapy strategies, and irradiation induced tumorigenesis
- Spatio-temporal evolution of cancer stem cells and self-metastatic tumors
- Modeling of the role of stem cells and tumour suppressor genes in tumorigenesis
- In-silico modeling of apoptosis, migration and proliferation in tumor dormancy
- Computational simulations and numerical schemes
- Visualization of 1D, 2D, and 3D solutions of mathematical models

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Invited lectures

- Annual Meeting of the Society for Mathematical Biology, Vancouver, Canada (2009)
- SIAM Conference on Computational Science and Engineering, Miami, USA (2009)
- Cells, Circuits and Computation, Boston, USA (2009)
- Systems Radiation Biology workshop, Rovaniemi, Finland (2009)
- European Conference on Mathematical & Theoretical Biology, Scotland (2008)
- PIMS Mathematical Biology Seminar, University of Alberta, Canada (2008)
- Boston Chaos Club, USA (2007)
- Mathematics Analysis & Biomathematics Seminar, Vanderbilt University, USA (2007)
- Marie Curie Research Training Network, University of Dundee, Scotland (2007)
- International Congress on Industrial and Applied Mathematics, Switzerland (2007)
- Vanderbilt University Integrative Cancer Biology Center, USA (2005 & 2006)

Conference/Symposium Organization

- Joint SMB-SIAM Conference on the Life Sciences, Raleigh, USA (2006)
- Joint SMB-JSMB Conference, San Jose, USA (2007)
- European Conference for Mathematical and Theoretical Biology, Edinburgh, UK (2008)
- SMB Conference, Vancouver, Canada (2009)

Publications

- 'Mathematical modelling of radiotherapy strategies for early breast cancer', *J Theor Biol.* 241(1), 158-171, 2006.
- 'Visualisation of the Numerical Solution of Partial Differential Equation Systems in Three Space Dimensions and its Importance for Mathematical Models in Biology', *Math Biosci Eng.* 3(4), 571-582, 2006.
- 'A mathematical model of breast cancer development, treatment and recurrence', *J Theor Biol.* 264(2), 245-259, 2007
- 'A model of breast carcinogenesis and recurrence after radiotherapy'. *Proc Appl Math Mech* 7(1), 1121701-1121702, 2007.
- 'Mathematical modelling of breast cancer growth, recurrence and local treatment strategies, with an ultimate goal of individualised treatment', in *Selected topics on cancer modeling – Genesis – Evolution – Immune Competition – Therapy* (eds. N. Bellomo, M. Chaplain and E. De Angelis), Birkhäuser, 2008.
- 'Mathematical modelling of stem cells related to cancer', in *Focus on cancer and stem cells* (eds. T. Dittmar & K.S. Zänker), Nova Science Publisher, 2008.
- 'Dependence of invadopodia function on collagen fiber spacing and crosslinking: computational modeling and experimental evidence'. *Biophys J* 95(5), 2203-2218, 2008.
- 'The importance of spatial distribution of stemness and proliferation state in determining tumor radioresponse'. *Math Model Nat Phenom* 4(3), 117-133, 2009.
- 'Migration rules: tumours are conglomerates of self-metastases', *Br J Cancer* 100(12), 1917-1925, 2009.
- 'Reply: Inflammatory breast carcinoma as a model of accelerated self-metastatic expansion by intra-vascular growth', *Br J Cancer* 101(6), 1030, 2009.
- 'Paradoxical dependencies of tumor dormancy and progression on basic cell kinetics', *Cancer Res* 69(22), 8814-8821, 2009.

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- 'Tumor morphological evolution: directed migration and gain and loss of the self-metastatic phenotype', *Biol Direct* 5:23, 2010.
- 'The promoting role of a tumor-secreted chemorepellent in self-metastatic tumor progression', *in revision*.
- 'Quantitative modeling of tumor dynamics and radiotherapy', submitted.

Peer reviewer

- Cancer Research
- PLOS Computational Biology
- Frontiers in Bioscience
- Mathematical Biosciences
- Journal of Theoretical Biology
- Bulletin of Mathematical Biology
- Mathematical Medicine and Biology
- Journal of Mathematical Biology