Curriculum Vitae of Till Bretschneider

Personal Details

Titel:	Dr. rer. nat., Dipl. Biologe
Work Address:	Max Planck-Institut für Biochemie *Tel:* 089 / 8578 - 23 29 Am Klopferspitz 18A *Fax:* 089 / 8578 - 38 85 D-82152 München, Germany *E-mail:* bretschn@biochem.mpg.de *WWW:* http://www.till-bretschneider.de
Home Address:	Frundsbergstraße 31 D-80634 München, Germany
Date of Birth:	1st June 1969
Citizenship:	German
Family Status:	Married, 1 child (2 years old)

Education

03/1995 – 02/1998	*Dissertation magna cum laude:* "Modelling *Dictyostelium*-Morphogenesis", Ludwig-Maximilians-Universität, München
11/1989 – 02/1995	Study of Biology, Ludwig-Maximilians-Universität, München *Major Subject:* Zoology *Minor Subjects:* Microbiology, Biochemistry, Physics *Thesis:* "Computational Modelling of Wave-Propagation in *Dictyostelium* Slugs"

Academic Positions

since April 2003	Research associate in the project "Dynamics of Membrane-associated Actin-Arp2/3 Complexes" of the DFG priority program SPP 1128 "Optical Analysis of the Structure and Dynamics of Supramolecular Biological Complexes" at the Max-Planck-Institute of Biochemistry, Martinsried, in the Celldynamics group of Günther Gerisch
04/2001 – 04/2003	Independent Schloessmann-Fellow at the Max-Planck Institute of Biochemistry
03/1998 – 03/2001	Research associate in the DFG special research program SFB 256 ("Non-linear Partial Differential equations") in the Theoretical Biology group of Wolfgang Alt, Rheinische Friedrich-Wilhelms-Universität, Bonn
08/1995 – 02/1998	Research associate at the Ludwig-Maximilians-Universität in the group of Cornelis J. Weijer

03/1995 – 07/1995	Fellow of the DFG graduate program "Cellular and Molecular Aspects of Development", Ludwig-Maximilians-Universität, München, associated member until 1998

Teaching

Diploma Students:	Thorsten Libotte: "Motion Analysis of Human Epidermal Keratinocytes on Fibronectin" (2000), Bonn
Summer Schools:	Course on individual-based modeling at the 2nd summerschool of the European Society for Mathematical and Theoretical Biology: June 11-18, 2001, Siguenza, Spain
Courses:	2001: "Interactive Motion in Tissues and Swarms" (with W. Alt) 2000: "Modeling and Simulation of Biological Systems" (with W. Alt) 1998: "Biological Rhythms" (with W. Alt and K. Brinkmann)
Seminars:	2000: "Motion and Dynamics of Tissues" (with W. Alt and J. Lenz) 2000: "Mechanisms of Molecular and Cellular Motion" (with W. Alt and J. Lenz)

Research Interests

Mechanisms of biological cell motion and tissue formation

Computational modelling and simulation of dynamic biological processes

Quantitative methods in image processing

Skills

Image Processing:	Quantification of spatio-temporal patterns of fluorescence labeled proteins in live cell imaging; development of intelligent segmentation procedures for tracking sub-cellular compartments; cell motility analysis; visualisation of complex multidimensional data sets; computer controlled video microscopy
Computational Modelling:	Development and implementation of complex models, in particular numerical simulations of hybrid (individual based and continous) models; model based analysis of protein-distribution patterns on the basis of reaction-diffusion models Solving finite differences, finite volume and finite element problems, in particular free boundary problems
Scientific Computing:	Many years of experience with common image processing and visualisation software as well as programming customised routines for it, programming in C, Objective C, Java, HTML use of MATLAB etc. and efficient numerical software libraries

International Experience

1996 – 1997	Stay at the University of Dundee as a doctoral candidate in the group of Cornelis J. Weijer

Awards

2000	Two-year grant (Schloeßmann-Fellowship) awarded by the Max-Planck Society in the course of the seminar "Mathematical Models in Biology, Chemistry and Physics" held in Bad Lausick

Munich, 23rd November 2005

List of Publications – Till Bretschneider

[1] S. Diez, K. Anderson, A. Müller-Taubenberger, G. Gerisch, and **T. Bretschneider**. Subsecond reorganization of the actin network in cell motility and chemotaxis. *Proceedings of the National Academy of Sciences of the United States of America*, 102(21):7601–7606, 2005.

[2] A. Schirenbeck, R. Arasada, **T. Bretschneider**, M. Schleicher, and J. Faix. Formins and VASP cooperate in the formation of filopodia. *Biochemical Society Transactions*, 33(6):1256–1259, 2005.

[3] A. Schirenbeck, **T. Bretschneider**, R. Arasada, M. Schleicher, and J. Faix. The Diaphanous-related formin dDia2 is required for the formation and maintenance of filopodia. *Nature Cell Biology*, 7(6):619–625, 2005.

[4] I. Weisswange, **T. Bretschneider**, and K. Anderson. Actin polymerization inhibits lateral membrane diffusion at the leading edge. *Journal of Cell Science*, 118(19):4375–4380, 2005.

[5] G. Gerisch, **T. Bretschneider**, A. Müller-Taubenberger, E. Simmeth, M. Ecke, S. Diez, and K. Anderson. Mobile actin clusters and travelling waves in cells recovering from actin depolymerization. *Biophysical Journal*, 87(5):3493–3503, 2004.

[6] **T. Bretschneider**, S. Diez, K. Anderson, J. Heuser, M. Clarke, A. Müller-Taubenberger, and G. Gerisch. Dynamic actin patterns and Arp2/3 assembly at the substrate-attached surface of motile cells. *Current Biology*, 14(1):1–10, 2004.

[7] **T. Bretschneider**. *Reinforcement of Cytoskeleton-Matrix Bonds and Tensiotaxis: A Cell-Based Model (In: Function and Regulation of Cellular Systems: Experiments and Models, Eds: Deutsch, A., Falcke, M., Howard, J., and Zimmermann, W.)*, pages 279–286. Birkhäuser, Basel, 2004.

[8] A. Müller-Taubenberger, S. Diez, K. Anderson, **T. Bretschneider**, and G. Gerisch. Visualizing the assembly of actin and actin-Arp2/3 complexes by total internal-reflection fluorescence microscopy. *Bio-TecReport*, T1:8, 2003.

[9] W. Alt, **T. Bretschneider**, and R. Müller. *Interactive Movement, Aggregation and Swarm Dynamics (In: Polymer and Cell Dynamics - Multiscale Modeling and Numerical Simulations, Eds: Alt, W., Chaplain, M., Griebel, M., Lenz, J.)*, pages 221–242. Birkhäuser, Basel, 2003.

[10] **T. Bretschneider**, J. Jonkman, J. Köhler, O. Medalia, K. Barisic, I. Weber, E.H.K. Stelzer, W. Baumeister, and G. Gerisch. Dynamic organization of the actin system in the motile cells of *Dictyostelium*. *Journal of Muscle Research & Cell Motility*, 23(7-8):639–649, 2002.

[11] A. Müller-Taubenberger, **T. Bretschneider**, J. Faix, A. Konzok, and I. Weber. Differential localization of the *Dictyostelium* kinase DPAKa during cytokinesis and cell migration. *Journal of Muscle Research & Cell Motility*, 23(7-8):751–763, 2002.

[12] D. Dormann, T. Libotte, C.J. Weijer, and **T. Bretschneider**. Simultaneous quantification of cell motility and protein-membrane-association using active contours. *Cell Motility & the Cytoskeleton*, 52(4):221–230, 2002.

[13] T. Libotte, H. W. Kaiser, W. Alt, and **T. Bretschneider**. Polarity, protrusion-retraction dynamics and their interplay during keratinocyte cell migration. *Experimental Cell Research*, 270(2):129–137, 2001.

[14] **T. Bretschneider**, B. Vasiev, and C.J. Weijer. A model for *Dictyostelium* slug movement. *Journal of Theoretical Biology*, 199(2):125–136, 1999.

[15] **T. Bretschneider**, B Vasiev, and C.J. Weijer. A model for cell movement during *Dictyostelium* mound formation. *Journal of Theoretical Biology*, 189(1):41–51, 1997.

[16] **T. Bretschneider** and F. Siegert. *Zelluläre Schleimpilze - ein Modellsystem für Zell-Zell Kommunikation: Experimente und Computersimulation (In: Nichtlineare Dynamik, Chaos und Strukturbildung, Eds: Meyer-Spasche, R., Rast, M., Zenger, C.)*, pages 25–33. Akademischer Verlag, München, 1997.

[17] **T. Bretschneider**, F. Siegert, and C.J. Weijer. Three-dimensional scroll waves of cAMP could direct cell movement and gene expression in *Dictyostelium* slugs. *Proceedings of the National Academy of Sciences of the United States of America*, 92(10):4387–4391, 1995.

Submitted Publications

[1] A. Schirenbeck, R. Arasada, **T. Bretschneider**, T.E.B. Stradal, M. Schleicher, and J. Faix. The bundling activity of VASP is required for filopodia formation. *submitted*, 2005.

Publications in preparation

[1] **T. Bretschneider**. Modelling of actin-wave propagation. *in preparation*, 2005.

[2] **T. Bretschneider**, A. Müller-Taubenberger, K. Anderson, and G. Gerisch. Zonal organisation of myosin I, Arp2/3 and coronin in self-organizing actin-waves. *in preparation*, 2005.

[3] J. Dalous, **T. Bretschneider**, Prassler J., Burghardt E., Ecke M., Müller-Taubenberger A., Gerisch G., and Bruckert F. Mechanosensitivity and polarisation of *Dictyostelium* cells under shear stress. Cytoskeleton reorganisation and protein relocalisation after a flow reversal. *in preparation*, 2005.