List of Publications

Disciplines covered by publications:

- theoretical physics and fluid mechanics,

- non-linear physics,

- experimental biophysics,

- biochemistry,

- micro-fabrication,

- material sciences,

- engineering (flow control).

C. Fütterer, M. Lücke,
Growth of binary fluid convection: the role of the concentration field,
Phys. Rev. E65, 36315-36334 (2002),

C. Fütterer, M. Lücke,
Growth of Nonlinear Patterns and Minimal-Convection Models for Binary Mixtures,
Theor. Comput. Fluid Dyn. , 16, 467 (2003),

Comment: this publication I introduced a nonlinear system of phase equations describing the mechanism for dissipative wave propagation.

P. S. Doyle, C. Fütterer, N. Minc, C. Goubault, J. Bibette, J.-L. Viovy,
Self Assembled Magnetic Colloids For DNA Separations in Microfluidic Devices,
Proceedings microTAS Symposium, Japan (2002), Kluwer Academic Publishers, Netherlands,

C. Fütterer, C. Colombo, F. Jülicher, A. Ott,
Morphogenetic oscillations during symmetry breaking of regenerating hydra vulgaris cells,
Europhys. Lett. 64, 137 (2003),

Comment: this publication was the first to investigate morphogenetic movements related to forces during regeneration opening the new field of physics of regeneration. It opened the field of physics of tissue morphogenesis and regeneration: Forces matter for regeneration.

C. Fütterer, V. Bormuth, J.-H. Codarbox, J. Rossier, J.-L. Viovy,
Injection and flow Control in Microchannels,
Lab Chip, 4, 351 (2004),

Comment: This publication describes a fundamental new microfluidic flow control method today applied by many companies and researchers.

N. Minc, C. Fütterer, K. D. Dorfman, A. Bancaud, C. Gosse, C. Goubauld, J.-L. Viovy,
Rapid and Quantitative Microfluidic Separation of DNA in Self-Assembled Magnetic Bead Matrices,

Anal. Chem. 76, 3770, (2004),

Comment: The following publications are based of the previous one describing a new flow method and allowed for the first time to separate quantitatively long DNA molecules by electrophoresis. This result gave rise to a quantitative model described here:

J. Weber, C. Fütterer, S. Gowri, R. Attia, J.-L. Viovy,
Vers une puce microfluidique pour la detection de mutation inconnue et le genotypage,
Article in SHF-Microfluidique 2004 Proceedings (2004),

Comment: Here we describe a new polymer improving the resolution of capillary electrophoresis to a level to detect single point mutations.

N. Minc, P. Bokov, K.B. Zeldovich; C. Fütterer, J.-L. Viovy, K. D. Dorfman,
Motion of single long DNA molecules through arrays of magnetic columns,
Electrophoresis, 2, 362-75, (2005),

Z. Bilkova, M. Slovakova, N. Minc, C. Fütterer, R. Cecal,
D. Horak, M. Benes, M. Hruby, I. le Potier, M. Przybylski, J.-L. Viovy,
Microscale reactors for total and limited proteolysis based on magnetic nano/microparticles developed for micro-chip applications,
Proteomics, 2005,

M. Slovakova, N. Minc, Z. Bilkova, C. Smadja, W. Faigle; C. Fütterer, M. Taverna, J.-L. Viovy,
Use of self assembled magnetic beads for on-chip protein digestion.
Lab Chip, 5, 935-942 (2005),

N. Minc, M. Slovakova, K. Dorfmann, C. Fütterer, P. Bokov, Z. Bilkova, C. Smagda, M. Taverna, J.-L. Viovy,
Microfluidic systems of self-assembled particles; application to DNA separation and protein digestion.
La Houille Blanche, 4, (2006),

A. Pallandre, D. Pal, B. de Lambert, J.-L. Viovy; C. Fütterer,
New "monolithic" templates and improved protocols for soft lithography and microchip fabrication.
J. Phys.: Condens. Matter 18, 665-676 (2006),

Comment: Here microfabrication by photolithography is made substantially more reliable.

T. Mach, C. Chimerel, J. Fritz, N. Fertig; M. Winterhalter, C. Fütterer,
Miniaturized planar lipid bilayer: Increased stability, low electric noise and fast fluid perfusion.
Anal Bioanal Chem (2007),

Comment: We discovered that miniaturization of planar bilayers leads to a significant reduction in the electrical noise signal.This is a big advantage for single molecule (pores and channels) research.

J. Whitehead, D. Vignjevic, C. Fütterer, E. Beaurepaire, S. Robine, E. Farge,

Mechanical factors activate beta-catenin-dependent oncogene expression in APC$^{1638N/+}$ mouse colon.
HFSP J., Volume 1, Issue 1 (2008), 286-294, IF: 2.317

Comment: This publication shows probably for the first time that mechanical stimulation also feeds back onto the gene expression contradicting the paradigm of molecular biology (genetic determinism)

During 2009-2011: Submission of 3 patents and technology transfer of 2 new fluidic control devices (now commercialized by Biophysical Tools/Breyer GmbH, Singen/Bodensee).

S. Koth, M. Krahe; C. Fütterer,
Fluctuations and symmetries in biology and physics,
Cell News 4 (2011), 41-46,

H. Kubitschke, C. Fütterer,
Dynamics of pore synthesis and degradation in protocells,
New Journal of Physics, Volume 14 (2012), 1-11,

Comment: this publication presents a theoretical model for experiments of Noireaux and Libchaber about protocells.

F. Huber , J. Schnauß , S. Rönicke , P. Rauch , K. Müller; C. Fütterer & J. Käs,
Emergent complexity of the cytoskeleton: from single filaments to tissue,
Advances in Physics, 62:1(2013), 1-112,

Michael Krahe, Iris Wenzel, Kao-Nung Lin, Julia Fischer, Joseph Goldmann; Markus Kästner, Claus Fütterer,
Fluctuations and differential contraction during regeneration of Hydra vulgaris tissue toroids,,
New Journal of Physics 15 (2013), 1-18.

Comment: Here we show for the first time a surprisingly complex folding scenario during regeneration based on a simple physical mechanism and discovered an trans-cellular force-generating actin structure.

Refereed Book Contribution

M. Lücke, W. Barten, P. Büchel, C. Fütterer, St. Hollinger, Ch. Jung,

Pattern Formation in Binary Fluid Convection and Systems with Throughflow,
Lecture Notes in Physics, published by F. H. Busse et S. C. Müller, p. 127-196, Springer-Verlag, Berlin (1998).

3 publications are in preparation on following topics:

- Regeneration of tissues (theory)
- Interaction of superparamagnetic particles (experiment)
- Mesofluidics and ultraprecise perfusive molecular switching

Multimedia: Production of broadcast video tape and Software

C. Fütterer, M. Lücke, R. Schmitz, *Transiente Konvektionsstrukturen in binären Mischungen (Transient Convection Patterns in Binary Mixtures)* (1999),

C. Fütterer, *Software for film production from digital images for Paralax video booard* (1999),

V. Bormuth, C. Fütterer, *xawtv4lab, Image and online film acquisition and treatment software for single molecule electrophoresis*, (2003),