

Part 1. Curriculum Vitae.

NAME Bartosz A. v. P. Grzybowski	POSITION TITLE Assistant Professor
eRA COMMONS USER NAME	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	MTH/YR(s)	FIELD OF STUDY
Yale University, New Haven, CT	B.S.	6/1995	Chemistry
Yale University, New Haven, CT	M.Sc.	6/1995	Chemistry
Harvard University, Cambridge, MA	Ph.D.	11/2000	Chemistry

A. Positions and Honors:

Professional Experience

10/2000 – 7/2001 Postdoctoral Fellow, Harvard University, Boston, MA

8/2001 – 7/2003 Director of Research, Concurrent Pharmaceuticals and Associate of the Department of Chemistry and Chemical Biology, Harvard University, Boston, MA

9/2003 - present Assistant Professor, Northwestern University, Evanston, IL

7/2001- present, Chief Scientific Officer, ProChimia Surfaces, Ltd.

Honors

1995 Arthur Fleischer Award for Outstanding Performance in Chemistry, Yale University

1995 Honoris in Chimia, Yale University

1995 Summa cum Laude, Yale University

2003 Camille and Henry Dreyfus New Faculty Award

2006 NSF CAREER Award

2006 3M Non-Tenured Faculty Award

2006 Pew Scholar in Biomedical Sciences

2006 ACS Division of Colloid and Surface Chemistry Unilever Award

2007 Sloan Fellowship

B. Peer Reviewed Publications

(the only book chapter is publication #6; Publications 1-40 are all from Northwestern)

Submitted (2007):

- [71] R. Klajn, K.J.M. Bishop & B.A. Grzybowski* Light-controlled self-assembly of reversible and irreversible nanoparticle suprastructures (2007).
- [70] M. Fialkowski, C. J. Campbell, K.J.M. Bishop & B.A. Grzybowski* “Ratchet” mechanism of reactive spreading and direct, visual determination of the kinetics of self-assembled monolayer formation (2007).

In Press:

- [69] A. M. Kalsin, B. Kowalczyk, P. Wesson & B. A. Grzybowski* Studying the thermodynamics of surface reactions on nanoparticles by electrostatic titrations, *J. Am. Chem. Soc.* (2007).
- [68] B.A. Grzybowski* & C.J. Campbell, Fabrication with “programmable” chemical reactions, *Materials Today* (2007) (invited review)
- [67] K.J. M. Bishop, C.J. Campbell, G. Mahmud, & B.A. Grzybowski* Bioinspired dynamic self-assembly, in *Self-Assembly – Intersdisciplinary Snapshots*, Elsevier, in press (2006).

Published:

- [66] R. Klajn, K.J.M. Bishop, M. Fialkowski, M. Paszewski, C.J. Campbell, T.P. Gray & B.A. Grzybowski* Plastic and moldable metals by self-assembly of sticky nanoparticle aggregates, *Science* **316**, 261-264 (2007).
- [65] A.M. Kalsin & B.A. Grzybowski* Controlling the Growth of “Ionic” Nanoparticle Supracrystals, *Nano Lett.* **7**, 1018-1021(2007)
- [64] M. Paszewski, S. K. Smoukov & B.A. Grzybowski* Multilevel surface nanostructuring via sequential photoswelling of dichromated gelatin, *Langmuir* DOI: 10.1021/la062982c (2007).
- [63] K. Kandere-Grzybowska, C.J. Campbell, G. Mahmud, Y.A. Komarova, S. Soh & B. A. Grzybowski* Cell Motility on Micropatterned Treadmills and Tracks. *Soft Matter* DOI: 10.1039/b617308j (2007). (highlight article)
- [62] D. Witt, P. Barski, B.A. Grzybowski* Versatile and efficient synthesis of ω -functionalized asymmetric disulfides via sulfenyl bromide adducts, *Langmuir*, **23**, 2318-2321 (2007).
- [61] A. M. Kalsin, A. Pinchuk, B.Kowalczyk, R. Klajn & B. A. Grzybowski* Ionic-like behavior of oppositely charged nanoparticles, *J. Am. Chem. Soc.*, **128**, 15046-15047 (2006).
- [60] K. J. M. Bishop, T. P. Gray, M. Fialkowski and B. A. Grzybowski* Micro-chameleons: Nonlinear chemical microsystems for amplification and sensing, *Chaos*, **16**, #037102 (2006).
- [59] K.J.M. Bishop and B.A. Grzybowski* Localized chemical wave emission and mode switching in a patterned excitable medium, *Phys. Rev. Lett.* **97**, #128702 (2006)
- [58] S.K. Smoukov & B. A. Grzybowski* Maskless microetching of transparent conductive oxides (ITO and ZnO) and semiconductors (GaAs) based on reaction-diffusion *J. Mater. Chem.*, **18**, 4722-4723 (2006).

- [57] A.M. Kalsin, M. Paszewski, A. Pinchuk, G.C. Schatz & B. A. Grzybowski* Electrostatic aggregation and formation of core-shell suprastructures in binary mixtures of charged metal nanoparticles, *Nano Lett.*, **6**, 1896 – 1903 (2006).
- [56] K.J. M. Bishop, R. Klajn & B.A. Grzybowski* The core and most useful molecules in organic chemistry *Angew. Chem. Int. Ed.*, **45**, 5348 (2006).
- [55] C. J. Campbell, S.K. Smoukov, K. J.M. Bishop, E. Baker & B.A. Grzybowski* Direct Printing of 3D and Curvilinear Micrometer-Sized Architectures into Solid Substrates with Sub-micrometer Resolution, *Adv. Mater.* **18**, 2004 (2006). (*cover art*)
- [54] A.M. Kalsin, M. Fialkowski, M. Paszewski, S.K. Smoukov, K. J.M. Bishop & B.A. Grzybowski* Electrostatic self-assembly of binary nanoparticle crystals with a diamond lattice, *Science*, **312**, 420 (2006).
- [53] M. Fialkowski, K.J. M. Bishop, R. Klajn, S.K. Smoukov, C.J. Campbell, B.A. Grzybowski* Principles and implementations of dissipative (dynamic) self-assembly, *J. Phys. Chem. B*, **110**, 2482 (2006). (*Feature Article*)
- [52] S.K. Smoukov, A. Bitner, C.J. Campbell, K. Kandere-Grzybowska & B.A. Grzybowski* Decorating surfaces with nanowaves of linearly increasing heights, *J. Am. Chem. Soc.*, **127**, 17803 (2005).
- [51] M. Fialkowski, K.J.M. Bishop, V. Chubukov, C.J. Campbell & B.A. Grzybowski*, The architecture and evolution of organic chemistry, *Angew. Chem. Int. Ed.*, **44**, 7263 (2005) (*cover art*)
- [50] K.J.M. Bishop, M.Fialkowski & B.A. Grzybowski*, Chemical waves, autofocusing and symmetry breaking in a purely oscillatory system, *J. Am. Chem. Soc.*, **127**, 15943 (2005).
- [49] B.A. Grzybowski*, M. Fialkowski & J.A. Wiles, Kinetics of contact electrification between metals and polymers *J. Phys. Chem. B*, **109**, 20511 (2005).
- [48] K.Kandere-Grzybowska, C.J. Campbell, Y. Komarova, B.A. Grzybowski* & G.G Borisov* Molecular dynamics imaging in micropatterned living cells, *Nature Methods* **2**, 739 (2005). (*cover art*)
- [47] A. Bitner, M. Fialkowski, S. Smoukov, C. J. Campbell, B. A. Grzybowski*, Visualizing changes in macromolecular structure by macroscopic reaction-diffusion patterns., *J. Am. Chem. Soc.* **127**, 6936 (2005).
- [46] B.A. Grzybowski*, K.J.M. Bishop, C.J. Campbell, M. Fialkowski, S.K. Smoukov, Micro- and nanotechnology via reaction-diffusion, *Soft. Matter*, **1**, 114 (2005). (*cover art*)
- [45] C.J. Campbell, E. Baker, M. Fialkowski and B.A. Grzybowski* Self-organization of planar microlenses by periodic precipitation, *J. Appl. Phys.* **97**, 126102/1 (2005).
- [44] S.K. Smoukov, C.J. Campbell, R. Klajn, K.J.M. Bishop & B.A. Grzybowski* Cutting into solids with gels, *Adv. Mater.* **17**, 1361 (2005).
- [43] C.J. Campbell, S.K. Smoukov, K.J.M. Bishop, and B.A. Grzybowski* Reactive surface micropatterning by Wet Stamping, *Langmuir*, **21**, 2637 (2005).
- [42] S. Smoukov, K. M. Bishop, C.J. Campbell & Bartosz A. Grzybowski* Freestanding, three dimensional copper foils prepared by electroless deposition on micropatterned gels. *Adv. Mater.* **17**, 751 (2005).
- [41] C.J. Campbell, R. Klajn, M. Fialkowski & B.A. Grzybowski*, One-Step, multilevel microfabrication by reaction-diffusion, *Langmuir*, **21**, 418 (2005). (*cover art*)
- [40] M. Fialkowski, A. Bitner & B.A. Grzybowski*, Self-assembly of polymeric microspheres of complex internal structures. *Nature Mater.*, **4**, 93 (2005) (*cover art*)
- [39] M. Fialkowski, A. Bitner & B.A. Grzybowski*, Wave optics of Liesegang rings. *Phys. Rev. Lett.*, **94**, 018303/1 (2005).
- [38] I.T. Bensemann, M. Fialkowski, R. Klajn & B. A. Grzybowski*, Wet stamping of microscale periodic precipitation patterns. *J. Phys. Chem. B*, **109**, 2774 (2005). (*cover art*)
- [37] A. Bitner, M. Fialkowski & B.A. Grzybowski*, Color micropatterning with reconfigurable stamps, *J. Phys. Chem. B* **108**, 19904 (2004).

- [36] J. A. Wiles, M. Fialkowski, M.R. Radowski, G.M. Whitesides & B.A. Grzybowski*, Effects of surface modification and moisture on the rates of charge transfer between metals and organic materials. *J. Phys. Chem. B*, **108**, 20296 (2004).
- [35] D. Witt, R. Klajn, P. Barski & B.A. Grzybowski* Applications, properties and synthesis of ω -functionalized n-alkanethiols and disulfides – the building blocks of self-assembled monolayers. *Curr. Org. Chem.*, **8**, 1763 (2004).
- [34] R. Klajn, M. Fialkowski, I.T. Bensemann, A. Bitner, C.J. Campbell, K.J.M. Bishop, S. Smoukov & B.A. Grzybowski*, Multi-color micropatterning of thin films of dry gels, *Nature Mater.* **3**, 729 (2004).
- [33] C. J. Campbell, E. Baker, M. Fialkowski & B. A. Grzybowski*, Arrays of microlenses of complex shapes prepared by reaction-diffusion in thin films of ionically-doped gels, *Appl. Phys. Lett.*, **85**, 1871 (2004).
- [32] C. J. Campbell, M. Fialkowski, R. Klajn, I.T. Bensemann & B.A. Grzybowski*, Color micro- and nanopatterning with counter-propagating reaction-diffusion fronts, *Adv. Mater.* **16**, 1921 (2004). (cover art; Cover of the Year Award)
- [31] M. Fialkowski, C.J. Campbell, I.T. Bensemann & B.A. Grzybowski*, Absorption of water by thin, ionic films of gelatin, *Langmuir* **20**, 3513 (2004).
- [30] B. A. Grzybowski*, M. Radowski, J.N. Lee, C.A. Campbell & G. M. Whitesides*, Self-assembling fluidic machines, *Appl. Phys. Lett.* **84**, 1798 (2004). (cover art)
- [29] B.A. Grzybowski* & C.A. Campbell, Complexity and dynamic self-assembly. *Chem. Eng. Sci.* **59**, 1667 (2004).
- [28] C.A. Campbell & B.A. Grzybowski*, Active microfluidic mixers: from microfabricated to self-assembling devices. *Phil. Trans. Roy. Soc.: Special Issue on Mixing and Transport at the Microscale.* **362**, 1069 (2004).

From Harvard:

- [27] J.A. Wiles, B.A. Grzybowski*, A. Winkleman & G.M. Whitesides*, A sensitive tool for studying contact electrification in systems comprising metals and insulating polymers. *Anal. Chem.* **75**, 4859 (2003).
- [26] J. Ng, M. Fuerstman, B.A. Grzybowski & G.M. Whitesides*, Dynamic self-assembly of systems of gears rotating at a liquid-air interface *J. Am. Chem. Soc.* **125**, 7948 (2003).
- [25] B.A. Grzybowski*, J.A. Wiles, A. Winkleman, Y. Brummer & G.M. Whitesides*, Electrostatic self-assembly of macroscopic crystals using contact electrification, *Nature Mater.* **2**, 241 (2003).
- [24] E. Ostuni, B.A. Grzybowski, M. Mrksich, C.S. Roberts & G.M. Whitesides*, Adsorption of proteins at well-defined hydrophobic sites on surfaces, *Langmuir*, **19**, 1861 (2003).
- [23] B.A. Grzybowski*, J.A. Wiles & G.M. Whitesides*, Dynamic self-assembly of rings of charged metallic spheres. *Phys. Rev. Lett.*, **90**, 083903 (2003).
- [22] G.M. Whitesides* & B.A. Grzybowski, Self-assembly at all scales, *Science* **295**, 2418 (2002)
- [21] B.A. Grzybowski* A.V. Ishchenko*, J. Shimada, & E.I. Shakhnovich, From knowledge-based potentials to combinatorial lead design in silico. *Acc. Chem. Res.* **35**, 261 (2002). (cover art)
- [20] B.A. Grzybowski* & G.M. Whitesides*, Directed dynamic self-assembly of objects rotating on two parallel fluid interfaces. *J. Chem. Phys.* **116**, 8571 (2002).
- [19] B.A. Grzybowski* & G.M. Whitesides*, Dynamic aggregation of chiral spinners. *Science* **296**, 718 (2002).
- [18] B.A. Grzybowski, A.V. Ishchenko, C.-Y. Kim, G. Topalov, R. Chapman, D.W. Christianson, G.M. Whitesides & E.I. Shakhnovich*, *De Novo* Design of potent

- inhibitors of Human Carbonic Anhydrase II using Small Molecule Growth Algorithm, *Proc. Nat. Acad. Sci. USA* **99**, 1270 (2002).
- [17] B.A. Grzybowski*, H.A. Stone & G.M. Whitesides*, Dynamics of self-assembly of magnetized disks rotating at the liquid-air interface. *Proc. Nat. Acad. Sci. USA* **99**, 4147 (2002).
- [16] B.A. Grzybowski* & G.M. Whitesides*, Three-dimensional dynamic self-assembly of spinning magnetic disks: Vortex Crystals. *J. Phys. Chem. B* **106**, 1188 (2001). (cover art)
- [15] B.A. Grzybowski* & G.M. Whitesides*, Macroscopic synthesis of self-assembled dissipative structures. *J. Phys. Chem. B*, **105**, 8770 (2001).
- [14] B.A. Grzybowski, N. Bowden, F. Arias, H. Yang & G.M. Whitesides*, Modeling of menisci and capillary forces from the millimeter to the micrometer size range. *J. Phys. Chem. A* **105**, 404 (2001).
- [13] H. Wu, S. Brittain, J.R. Anderson, B.A. Grzybowski, S. Whitesides & G.M. Whitesides*, Fabrication of topologically complex three-dimensional microstructures: metallic microknots. *J. Am. Chem. Soc.* **122**, 12691 (2000).
- [12] B.A. Grzybowski*, X. Jiang, H.A. Stone & G.M. Whitesides*, Dynamic self-assembled aggregates of magnetized, millimeter-sized objects rotating at the liquid-air interface: macroscopic, two-dimensional classical artificial atoms and molecules. *Phys. Rev. E*. **6401**, 1603-+ (2001).
- [11] B.A. Grzybowski, A. Ischenko, R. DeWitte, G.M. Whitesides, E.I. Shakhnovich* Derivation of a knowledge-based potential for hydrogen bonds in crystals of small organic molecules, *J. Phys. Chem B* **104**, 7293 (2000).
- [10] B.A. Grzybowski, H.A. Stone & G.M. Whitesides*, Dynamic self-assembly of millimeter-sized disks spinning on a liquid-air interface. *Nature* **405**, 1033 (2000).
- [9] B.A. Grzybowski, D. Qin, R. Haag & G.M. Whitesides*, Elastomeric optical elements with corner-cube surface topographies. *Sensors & Actuators A* **86**, 81 (2000).
- [8] B.A. Grzybowski, J.R. Anderson, I. Colton, S.T. Brittain, E.I. Shakhnovich & G.M. Whitesides*, Modeling the kinetics of acylation of insulin using a recursive method for solving the systems of coupled differential equations. *Biophys. J.* **78**, 652 (2000).
- [7] J. Lahiri, L. Isaacs, B.A. Grzybowski, J. Carbeck & G.M. Whitesides*, Biospecific binding of carbonic anhydrase to mixed SAMs presenting benzenesulfonamide ligands: A model system for studying lateral steric effects. *Langmuir* **15**, 7186 (1999).
- [6] B. Xu, F. Arias, S.T. Brittain, M. Zhao, B.A. Grzybowski, S. Torquato & G.M. Whitesides*, Making negative Poisson's ratio microstructures by soft lithography. *Adv. Mater.* **11**: (14) 1186-1189, 1999.
- [5] N. Bowden, I.S. Choi, B.A. Grzybowski & G.M. Whitesides*, Mesoscale self-assembly of hexagonal plates using lateral capillary forces: Synthesis using the "capillary bond" *J. Am. Chem. Soc.* **121**, 5373 (1999).
- [4] B.A. Grzybowski, D. Qin, & G.M. Whitesides*, Beam redirection and frequency filtering with transparent elastomeric diffractive elements. *Appl. Opt.* **38**, 2997 (1999).
- [3] B.A. Grzybowski, S.T. Brittain & G.M. Whitesides*, Thermally actuated interferometric sensors based on the thermal expansion of transparent elastomeric media. *Rev. Sci. Instrum.* **70**, 2031 (1999).
- [2] B.A. Grzybowski, R. Haag, N. Bowden & G.M. Whitesides*, Generation of micrometer-sized patterns for microanalytical applications using a laser direct-write method and microcontact printing. *Anal. Chem.* **70**, 4645 (1998).

From Yale:

- [1] Q.G. Zhang, P. Dupre, B.A. Grzybowski, & P.H. Vaccaro* Laser induced fluorescence studies of jet-cooled S₂O -- axis switching and predissociation effects, *J. Chem. Phys.* **103**, 67-79, (1995)

C. Publications in Popular Press (not peer-reviewed).

1. B. A. Grzybowski, Crawling cells: How to stop cancer, *Polityka*, **45** (2529), 87, 2005.
2. B. A. Grzybowski, Nanoionics – Engineering Nanostructured Crystals from Charged Nanoparticles, *Science at Stake*, www.scienceatstake.com, May 8 (2006)

D. Commissioned Books:

1. “*From Crystals to Cells: Self-Assembly in Equilibrium and Dissipative System*” World Scientific, due October 2007
2. “*Chemistry in Motion: Reaction-diffusion at micro and nanoscales*” Wiley, due May 2007

E. Invited Lectures:

1. NECSI International Conference on Complex Systems (Nashua, NH, 2000)
2. Politechnika Gdanska (Poland, 2001)
3. Freiburg University (Germany, 2002)
4. EMBL Heidelberg (Germany, 2002)
5. European Workshop on Morphology of Surfaces and Interfaces in Soft Matter (Jadwisin, Poland 2003)
6. Moscow State University (Russia, 2003)
7. AIChE Annual Meeting, San Francisco (2003)
8. University of Munster (Germany, 2004)
9. Brown University (2004)
10. Volkswagen Conference on Complexity (Germany, 2005)
11. EPA Workshop on Self-Assembly (Cincinnati, 2005)
12. International Conference on the Technologies of the 21st Century, Moscow (2005)
13. Stanford University (2005)
14. NICO Launch Seminar (Northwestern, 2005)
15. Halliburton, Inc. (2005)
16. MATNON’05 International Conference on Nonlinear Systems (Kyoto, Japan, 2005)
17. Workshop on Stochastic Effects in Liesegang Patterns Formation (Sils-Maria, Switzerland, 2006)
18. ACS Colloid and Surface Science Symposium (Boulder, 2006)
19. Gordon Research Conference (Oxford, England, 2006)
20. Lehigh University (2006)
21. Illinois Institute of Technology, Chemistry Department (2006)
22. ACS Annual Meeting, San Francisco (2006)
23. NSF US-Poland Workshop on Nanotechnology (Poznan, Poland, 2006)
24. Dow Chemical (2006)
25. 3M (2006)
26. NIH/NCI Nanotechnology in Cancer Research, Investigators Meeting (San Diego, 2006)
27. Yale University (2007)
28. Keystone Symposium, Nanotechnology in Biomedicine (Tahoe City, 2007)
29. Pew Scholars Meeting (Mexico, 2007)
30. International Conference on Bioinspired Engineering (Dead Sea, Israel, 2007)
31. Freie Universitat Berlin (2007)
32. ACS Annual Meeting, Chicago, PMSE Symposium (Chicago, 2007)
33. ACS Annual Meeting, Chicago, Colloidal Atoms Symposium (Chicago, 2007)

34. ACS Annual Meeting, Chicago, George Whitesides Symposium (Chicago, 2007)
35. ACS Colloids Meeting, , keynote lecture (University of Delaware, 2007)
36. Gordon Conference on Thin Films and Crystal Growth (Mt. Holyoke College, 2007)
37. Illinois Institute of Technology, Chemical Engineering Department (2006)

F. Press coverages of independent scientific work (2004-2006):

The Industrial Physicist, Technology Research News, Physik in Unserer Zeit (Germany), Materials Today, Photonics Spectra, Nanotech Alert (Germany), Polityka (Poland), Wiedza i Zycie (Poland), Neue Zurcher Zeitung (Switzerland), Chemical & Engineering News (2), Science Perspectives, Nature News, Chicago Tribune, MRS Bulletin

G. Research Support:

1. ACS-Petroleum Research Fund AC Grant #42953-AC5, *Dynamic Self-Assembly of Nanoparticle Arrays*. Years 2005-2007.
2. NSF Grant #0503673, *Dynamic Self-Assembly Mediated by Contact Electrification*. Years 2005-2007.
3. NSF CAREER Award # CTS-0547633, *Programming Chemical Reactions in Space and Time – Micro and Nanoscience via Reaction-Diffusion in Complex Microgeometries*. Years 2006-2009.
4. NIH Grant# 1U54CA119341-0, *Deconstructing Directional Cell Motility in Cancer Metastasis through Substratum Nano-Patterning*. Years 2006-2010.
5. 3M New Faculty Award, *Organic microelectronics by reaction-diffusion*. Year 2006-2007.
6. Camille and Henry Dreyfus New Faculty Award, *Dynamic Self-Assembly*. Years 2003-2007.
7. Baxter Healthcare, *Deconstructing Directional Cell Motility by Substratum Micropatterning and Dynamic Imaging Approaches*. Years 2005-2007.
8. Pew Fellowship in Biomedical Sciences Years 2006-2009.
9. International institute of Nanotechnology (equipment grant, 2006)