

EKATERINA N. KADNIKOVA, PH. D.

Assistant Professor of Chemistry

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EDUCATION AND TRAINING

- Postdoctoral training in organic and materials chemistry, 2001-2004, University of California – Berkeley and Lawrence Berkeley National Laboratory, Berkeley, CA. Advisor: Prof. Jean M. J. Fréchet.
- Ph. D., Organic Chemistry, 2001, Iowa State University, Ames, IA. Advisor: Prof. Nenad M. Kostić. Dissertation: “*Organic Reactions Catalyzed by Enzymes Encapsulated into Sol-Gel Glass.*” GPA 3.9/4.0.
- 1998 Inorganic Biochemistry Summer Workshop (NSF), Center for Metalloenzyme Studies, University of Georgia, Athens, GA.
- Diploma in Chemistry (*magna cum laude*), 1997, Higher Chemical College of the Russian Academy of Sciences, Moscow, Russia. GPA 4.9/5.0.

PROFESSIONAL HISTORY

University of Missouri – Kansas City

Assistant Professor

Fall 2004 – present

University of California – Berkeley and Lawrence Berkeley National Laboratory

Postdoctoral Research Fellow

Fall 2001 – Summer 2004

Iowa State University, Ames

Graduate Research Assistant

Fall 1995 – Fall 2001

Research Intern

Summer 1994

N. D. Zelinsky Institute of Organic Chemistry, Moscow

Undergraduate Research Associate

Fall 1992 – Spring 1995

RESEARCH INTERESTS

Bioorganic chemistry, enantioselective catalysis, dynamic kinetic resolution, biocatalysis; polymer synthesis, enzymatic polymerization; hybrid organic-inorganic materials, macromolecular nanostructures for biomedical and materials applications

TEACHING

University of Missouri – Kansas City

Selected Topics in Organic Chemistry / Advanced Theoretical Organic Chemistry (CHEM 529), Introduction to Polymer Chemistry (CHEM 5571), Elementary Organic Chemistry (CHEM 320), Organic Chemistry II (322) / Survey of Organic Chemistry (520), Organic Chemistry Laboratory I and II (CHEM 321L, 322L), Introduction to Research (CHEM 399)

Iowa State University, Ames

Temporary Instructor in General Chemistry II (Chem 178), Recitation and Lab Teaching Assistant in General Chemistry and Organic Chemistry (Chem 177, 177L, 331L, 321L)

AWARDS, HONORS

- *UMKC Teaching Enhancement Grant (PI)*, “Helping students succeed in organic chemistry with “study baskets” and discussion media,” 2010-2011
- *UMRB Research Grant (PI)*, “Hybrid nanoparticles *via* enzymatic polymerization of functionalized cores,” 2010-2011
- *UMKC Faculty Research grant (PI)*, “Enzyme-catalyzed synthesis of core-shell nanoparticles,” 2008-2009
- *UMRB Research Grant (PI)*, “Immobilized enzymes for organic catalysis,” 2006-2007
- *ACS Service Award*, Ames Local Section of American Chemical Society and Department of Chemistry, Iowa State University, Ames, Spring 2001
- *Hoechst-Celanese Research Excellence Award*, Chemistry Department, Iowa State University, Ames, Spring 1998
- *Personal Research Grant*, International Science Foundation, Moscow, 1994–1995
- *Academic Achievement Scholarship*, Higher Chemical College of the Russian Academy of Sciences, Moscow, Fall 1991 – Spring 1995

OTHER PROFESSIONAL EXPERIENCES AND MEMBERSHIP

- *Regular peer reviewer for international journals (J. Am. Chem. Soc., J. Org. Chem., Appl. Microbiol. Biotechnol., Express Polym. Lett., J. Phys. Chem. Solids) and US granting agencies (National Science Foundation (Chemistry, Materials Research), US Department of Energy (BES), ACS Petroleum Research Fund, Research Corp., University of Missouri Research Board), textbook reviewer for publishers (Wiley, W. W. Norton), 2004-present*
- Science Mentor and Science Fair Judge, Science Pioneers, 2007-present
- *Session Chair at the National and Regional meetings of the American Chemical Society, 2006-present*
- *Participant in the New Faculty Teaching Scholar system-wide program at the University of Missouri, 2005-2006*
- *American Chemical Society and its Division of Organic Chemistry: member since 1996*
- *Ames Local Section of the American Chemical Society: US National Chemistry Olympiad Coordinator (1999 – 2001), National Chemistry Week Event Coordinator (1999 – 2001), Secretary (1999)*
- *Russian National Chemistry Olympiad Task Force, Moscow, 1992–1993*

RECENT INVITED LECTURES (INDEPENDENT RESEARCH ONLY)

- “Adventures in enantioselective biocatalysis and functionalized nanoparticles,” Washington University, St Louis, Mar 17, 2011.
- “Biocatalytic dynamic kinetic resolution as route to chiral unsaturated alcohols,” Iowa State University, Department of Chemistry, Nov 5, 2009.
- “Biocatalytic dynamic kinetic resolution as route to chiral unsaturated alcohols,” University of Kansas, Department of Chemistry, Sept 25, 2009.
- “Adventures in dynamic kinetic resolution of esters,” University of Missouri – St. Louis, Department of Chemistry and Biochemistry, Sept 22, 2008.
- “Adventures in the kinetic and dynamic kinetic resolution of unsaturated esters,” Missouri State University, Department of Chemistry, Apr 7, 2008.
- “Adventures in the kinetic and dynamic kinetic resolution of esters,” Saint Louis University, Department of Chemistry, Oct 26, 2007.
- “Enantioselective hydrolysis of allylic acetates catalyzed by immobilized lipases,” University of Missouri – Rolla, Department of Chemistry, Nov 6, 2006.

RECENT PRESENTATIONS (INDEPENDENT RESEARCH ONLY)

- Ekaterina N. Kadnikova, ““Molecules-in-Medicine” on Blackboard: Peer-evaluated presentations in organic chemistry,” CHED-74, 241st ACS National Meeting, Anaheim, CA, March 27-31, 2011 (poster). *This paper was also selected and showcased in the SCI-MIX interdisciplinary event.*
- Ekaterina N. Kadnikova, Dmitry A Baranov, Alexander S Vorushilov, ““Click”-chemistry derivatization of azidoalkyl-functionalized nanoparticles for subsequent enzymatic polymerization,” ORGN-104, 241st ACS National Meeting, Anaheim, CA, March 27-31, 2011 (poster)
- Ekaterina N. Kadnikova, Vikalp A. Thakor, Dylan T. Werth, and Anton V. Dubrovskiy, “Biocatalytic dynamic kinetic resolution of 1-arylallylic and 1-arylpropargylic esters: Route to chiral unsaturated alcohols,” ORGN-403, 236th ACS National Meeting, Philadelphia, PA, August 17-21, 2008 (poster)
- Ekaterina N. Kadnikova and Vikalp A. Thakor, “Biocatalytic dynamic kinetic resolution of esters into chiral unsaturated alcohols,” Gordon Research Conference on Biocatalysis, Bryant University, Smithfield, RI, July 6-11, 2008 (poster)
- Ekaterina N. Kadnikova and Vikalp A. Thakor, “Kinetic and Dynamic Kinetic Resolution of Esters Using Immobilized Lipase and Transition-Metal Complexes,” paper # 76, ACS Midwest Regional Meeting, Kansas City, Mo., Nov 7-10, 2007 (talk)
- Ekaterina N. Kadnikova and Vikalp A. Thakor, “Design and synthesis of gold-polyphenol core-shell nanoparticles,” Gordon Research Conference on Polymers (East), South Hadley, Mass., June 17-22, 2007 (poster)
- Ekaterina N. Kadnikova and Vikalp A. Thakor, “Kinetic and Dynamic Kinetic Resolution of 1-Arylallyl Acetates via Lipase-Catalyzed Hydrolysis and Alcoholysis,” B-57, 40th National Organic Symposium, Durham, N.C., June 3-7, 2007 (poster)
- Ekaterina N. Kadnikova and Vikalp A. Thakor, “Kinetic and Dynamic Kinetic Resolution of 1-arylallyl acetates using Immobilized Lipase and Transition-Metal Complexes,” paper # 21, Missouri Organic Day, Columbia, Mo., Apr 28, 2007 (poster)
- Ekaterina N. Kadnikova and Vikalp A. Thakor, “Dynamic kinetic resolution of esters with immobilized catalysts,” ORGN-359, 232nd ACS National Meeting, San Francisco, CA, Sept. 10-14, 2006 (talk)
- E. N. Kadnikova and Vikalp A. Thakor, “Dynamic kinetic resolution of substituted 1-phenylallyl acetates using immobilized lipases and immobilized palladium complexes,” ORGN-156, 232nd ACS National Meeting, San Francisco, CA, Sept. 10, 2006 (poster)
- Ekaterina N. Kadnikova and Vikalp A. Thakor, “Dynamic kinetic resolution of esters using immobilized catalysts,” Gordon Research Conference on Biocatalysis, Bryant University, Smithfield, RI, July 9-14, 2006 (poster)

- Ekaterina N. Kadnikova and Vikalp A. Thakor, "Kinetic and dynamic kinetic resolution of allylic acetates using immobilized lipases," ORGN-90, 231st ACS National Meeting, Atlanta, GA, March 26-30, 2006 (poster)

PUBLICATIONS (* = from independent research)

- 16.* Ekaterina N. Kadnikova, ""Molecules-in-Medicine" on Blackboard: Peer-evaluated presentations in one-semester organic chemistry course for non-majors," manuscript to be submitted to *Journal of Chemical Education*.
- 15.* Ekaterina N. Kadnikova,* Dylan T. Werth, and Himanshu K. Banda, "Enantioselective kinetic resolution of 1-arylpropargylic esters into chiral 1-arylprop-2-yn-1-ols catalyzed by *Candida antarctica* lipase," under revision for *Tetrahedron: Asymmetry*.
- 14.* Dmitry Baranov and Ekaterina N. Kadnikova, "Synthesis and characterization of azidoalkyl-functionalized gold nanoparticles as scaffolds for "click"-chemistry derivatization," *J. Mater. Chem.* **2011**, *21*, 6152-6157.
- 13.* Xue-Yi Chen, Charles Barnes, Xinyan Bai, T. C. Sandreczki, Zhonghua Peng, Ekaterina N. Kadnikova and J. R. Dias,* "Synthesis and structural analysis of a novel iodinated cyclopentadienone via ring-contraction iodination and its application in synthesis of alkyne-functionalized cyclopentadienones," *Chem. Commun.* **2010**, *46*, 8171-8173.
- 12.* Ekaterina N. Kadnikova* and Vikalp A. Thakor, "Enantioselective Hydrolysis of 1-Arylallyl Acetates Catalyzed by *Candida Antarctica* Lipase," *Tetrahedron: Asymmetry* **2008**, *19*, 1053-1058.
11. Chiatzun Goh, R. Joseph Kline, Michael D. McGehee, Ekaterina N. Kadnikova and Jean M. J. Fréchet, "Molecular Weight Dependent Mobilities in Regioregular Poly(3-hexylthiophene) Diodes," *Appl. Phys. Lett.* **2005**, *86*, 122110 (1-3).
10. R. Joseph Kline, Michael D. McGehee, Ekaterina N. Kadnikova, Jinsong Liu, Jean M. J. Fréchet and Michael F. Toney, "Dependence of Regioregular Poly(3-hexylthiophene) Film Morphology and Field-Effect Mobility on Molecular Weight," *Macromol.* **2005**, *38*, 3312.
9. Jinsong Liu, Ekaterina N. Kadnikova, Jean M. J. Fréchet, Yuxiang Liu, and Michael D. McGehee, "Polythiophene Containing Thermally Removable Solubilizing Groups Enhances the Interface and the Performance of Polymer-Titania Hybrid Solar Cells," *J. Am Chem. Soc.* **2004**, *126*, 9486-9487.
8. Chiatzun Goh, R. Joseph Kline, Michael D. McGehee, Ekaterina N. Kadnikova, Jinsong Liu, and Jean M. J. Fréchet. "Molecular weight dependent mobilities in regioregular poly(3-hexyl-thiophene) diodes and transistors". *Polymer Prepr.* **2004**, *45*, 210-211.
7. R. Joseph Kline, Michael D. McGehee, Ekaterina N. Kadnikova, Jinsong Liu, and Jean M. J. Fréchet, "Controlling the Field-Effect Mobility of Regioregular Polythiophene by Changing the Molecular Weight," *Adv. Mater.* **2003**, *15*, 1519-1522.
6. Ekaterina N. Kadnikova and Nenad M. Kostić, "Effects of the Environment on Microperoxidase-11 and on Its Catalytic Activity in Oxidation of Organic Sulfides to Sulfoxides," *J. Org. Chem.* **2003**, *68*, 2600-2608.
5. Ekaterina N. Kadnikova and Nenad M. Kostić, "Effects of the Matrix on Oxidation of ABTS by Hydrogen Peroxide Catalyzed by Horseradish Peroxidase Encapsulated into Sol-Gel Glass," *J. Mol. Cat. B: Enz.* **2002**, *18*, 33-42.
4. Jovica D. Badjić, Ekaterina N. Kadnikova, and Nenad M. Kostić, "Enantioselective Aminolysis of an α -Chloroester Catalyzed by *Candida Cylindracea* Lipase Encapsulated in Sol-Gel Silica Glass," *Org. Lett.* **2001**, *3*, 2025-2028.
3. Ekaterina N. Kadnikova and Nenad M. Kostić, "Sol-Gel Glass Is Not Necessarily an Inert Matrix for Enzyme Encapsulation. Catalysis of Sulfoxidation by Silica," *J. Non-Cryst. Solids* **2001**, *283*, 63-68.
2. Ekaterina N. Korneeva, Maxim V. Ovchinnikov, and Nenad M. Kostić, "Peptide Hydrolysis Promoted by Polynuclear and Organometallic Complexes of Palladium(II) and Platinum(II)," *Inorg. Chim. Acta* **1996**, *243*, 9-13.
1. Emmanuil I. Troyansky, Rustem F. Ismagilov, Ekaterina N. Korneeva, Mariam S. Pogosyan, and Gennady I. Nikishin, "An Approach to 8-, 16- and 24-Membered Sulfur-Containing Heterocycles via Homolytic Cycloaddition of Alkynes with Butane-1,4-dithiol," *Mendeleev Commun.* **1995**, *5*, 18-20.

RESEARCH GROUP MEMBERS

Current research group members (as of April 2011), their background and curricula

- Mr. Keegan Nelson (graduate student), pursuing MS in Chemistry since 8/2010
- Mr. Zachary Butz (undergrad), pursuing BA in Chemistry / BA in Biology since 9/2010
- Mr. Dean Merrill (undergrad), BA in Economics (U Penn),
finishing BA in Chemistry / BS in Biology (UMKC) since 9/2010
- Ms. Kennette Pen (undergrad), pursuing BA in Chemistry (Communications minor) since 1/2010
- Mr. Richard Wu (undergrad), pursuing BS in Chemistry and BS in Biology since 2/2011
- Mr. Christopher Brett (undergrad), pursuing BA in Chemistry / MD since 6/2011
- Mr. Gautham Anand (undergrad), pursuing BA in Chemistry / MD since 6/2011

Group alumni (in the order of departure):

Name	Position*	Time in lab	Where are they now
Dr. Alexander S. Vorushilov, PhD	Postdoc	10/10-6/11	Postdoctoral training in nanoscience (U of New Hampshire)
Mr. Vladimir I. Kulish	US	9/10-4/11	Pursuing BS in Chemistry (UMKC)
Ms. Jessica Robinson, MEd	GS	6-9/10	Pursuing non-thesis MS in Chemistry (UMKC) and working full-time as a high-school chemistry teacher
Ms. Sara Monfared	US	7/09-10/10	Pursuing BA in Chemistry / MD (UMKC)
Mr. Thiran Udawatta	US	7/09-5/10	Pursuing BA in Chemistry / MD (UMKC)
Mr. Neshal B. Patel	US	10/08-2/10	Pre-Pharmacy student (UMKC)
Mr. Joshua O. Adegoke	US	9/09-2/10	Pursuing BLA / MD (UMKC)
Ms. Evgeniya O. Tretyakova	VSUS	7-9/08, 6-8/09	MS in Chemistry (6/10), pursuing PhD in Organic Chemistry (IOCh, Russia)
Ms. Vanessa Smith	US	6-7/09	Pursuing BLA / MD (UMKC)
Mr. Neal S. Akhave	US	7/09	Pursuing BLA / MD (UMKC)
Mr. Gene Y. Kim	US	7/09	Pursuing BLA / MD (UMKC)
Ms. Meryl M. Stutte	US	8/08-5/09	BA in Chemistry (UMKC, 5/09), pursuing PharmD (UMKC)
Mr. Dmitry A. Baranov, MS	VSUS	6-9/08	MS in Inorganic Chemistry (U of Chicago), starting PhD in Inorganic Chemistry in 8/11 (U of Colorado)
Mr. Adil S. Akthar	US	6-8/08	Pursuing BLA / MD (UMKC)
Ms. Mariam T. Nawas	US	6-8/08	Pursuing BLA / MD (UMKC)
Mr. Dylan T. Werth	US	8/07-7/08	Finishing BA in Chemistry / MD (UMKC)
Mr. Tommel Samani	US	6-7/08	BS in Biology / Chemistry minor (12/08), pursuing MD (AUC)
Mr. Vikalp A. Thakor, MS	RA/Tech	8/05-10/07	R&D Chemist at Primus Diagnostics/Trinity Biotech
Ms. Hsiao-Lin Wang	US	2-8/07	BS/BS in Biology / Chemistry (UMKC, 5/09), starting PhD in Biology in 8/11 (UMKC)
Ms. Nimisha Verma	US	6-8/07	Finishing BLA / MD (UMKC)
Mr. Himanshu K. Banda	US	6-8/07	Finishing BLA / MD (UMKC)
Mr. Daniel Yarrow	US	10/05-3/07	PharmD (UMKC, 5/11)
Ms. Tiffany L. Coleman	US	12/05-11/06	BLA / Chemistry minor (5/07), working at Aptuit
Mr. Anton V. Dubrovskiy	VSUS	6/06-8/06	MS in Chemistry (6/07), finishing PhD in Organic Chemistry (Iowa State University)
Mr. Evgeny V. Kremer	VSUS	6/05-8/05	MS in Chemistry (6/10), working at InterLab/Hitachi

* US = UMKC undergraduate student; GS = UMKC graduate student; VSUS = visiting summer undergraduate student (Higher Chemical College RAS, Moscow, Russia); RA/Tech = research associate / technician; Postdoc = postdoctoral research associate

RESEARCH RELATIONSHIPS AND COLLABORATORS

University of Missouri – Kansas City

- Department of Chemistry
 - Prof. Zhonghua Peng and Mr. Sanjiban Chakraborty (POMs in photoswitchable systems)
- School of Pharmaceutical Sciences
 - Prof. William G. Gutheil (stereoselectivity in bacterial metabolic pathways)
- School of Dentistry
 - Prof. Yong Wang and Dr. Vladimir Dusevich (TEM of nanoparticles)
- School of Biological Sciences
 - Prof. J. Andrew Keightley (MALDI of polymers)
 - Prof. Douglas Law and Ms. Leanne Szerszen (TEM of nanoparticles)

South Dakota State University

- Department of Chemistry and Biochemistry
 - Prof. Matthew Miller (long-term assessment of student engagement in organic chemistry courses)