

## ALEXANDER A. SHESTOPALOV

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### A. PROFESSIONAL PREPARATION

2002 M.S. in Chemistry – Moscow State University, Moscow, Russia (with honors)  
2004 PhD in Organic Chemistry – Zelinsky Institute, RAS, Moscow, Russia  
Advisors: Prof. Viktor Litvinov and Prof. Alan Katritzky  
2009 PhD in Physical Chemistry – Duke University, Durham, NC  
Advisor: Prof. Eric Toone

### B. APPOINTMENTS AND PROFESSIONAL TRAINING

2002-2004 Graduate Student in Chemistry, Zelinsky Institute RAS/University of Florida  
2004-2005 Postdoctoral Fellow in Chemistry, University of Florida, Gainesville, FL  
2005-2009 Graduate Student in Chemistry, Duke University, Durham, NC  
2010-present Assistant Prof. of Chemical Engineering, University of Rochester, Rochester, NY  
(secondary appointments in Materials Science and Chemistry cluster)

### C. PROFESSIONAL EXPERTISE

Physical Chemistry, Synthetic Organic Chemistry, Interfacial and Colloidal Science, Interfacial Thermodynamics, Interfacial Engineering and Manufacturing at the Micro- and Nano-Scales

### D. CURRENT COLLABORATORS AND AFFILIATIONS

#### Graduate and Postdoctoral Advisors:

Ph.D. advisor: Prof. Viktor P, Litvinov, Ph.D. (Zelinsky Institute, Moscow)  
Ph.D. advisor: Prof. Eric J. Toone, Ph. D. (Duke University)  
Postdoc advisor: Prof. Alan R. Katritzky, Ph. D. (University of Florida)

#### Graduate and Postdoctoral Advisees:

Postdoctoral Fellows: Dr. Rui Shen (2010-2013)  
PhD Students: Yekaterina Lyubarskaya (graduated 2014)  
Jinhai Li (graduated 2015)  
Xunzhi Li (expected 2019)  
So Youn Kim (expected 2020)  
MS Students: Jeffrey Shapanka (graduated 2013)  
Xiaolei Chu (graduated 2013)  
Ryan Green (graduated 2014)  
Wenchuan Ma (graduated 2015)  
Nan Liu (expected 2016)  
Boya Zhang (expected 2017)

#### Collaborators:

Prof. Ching W. Tang (University of Rochester)  
Prof. James McGrath (University of Rochester)  
Prof. Mitchel Anthamatten (University of Rochester)  
Prof. Lewis Rothberg (University of Rochester)

Prof. John Lambropoulos (University of Rochester)

Prof. JT Zuilhof (Wageningen University)

## E. TEACHING EXPERIENCE

CHE 225 Chemical Engineering Thermodynamics (junior level, 4 credits) 2010-current

CHE 492/292 Biointerfaces (graduate/advanced undergraduate, 4 credits) 2011-2016

CHE 4XX/2XX Interfacial Analysis (graduate/advanced undergraduate, 4 credits) 2017-

## F. SYNERGISTIC ACTIVITIES

-Member of the departmental undergraduate advisory committee

-Summer research experience outreach program including first generation and minority students (UofR, Xerox Fellows).

-High school summer outreach program – “Careers in Engineering” (UofR Pre-college)

-Member of two professional organizations (ACS, AIChE)

-Reviewer for chemistry and materials science journals

## G. FULL LIST OF PUBLICATIONS

### In Submission

1. “Functionalization of ultrathin silicon nitride membranes via vapor-based carbenylation” Xunzhi Li, Dean G Johnson, Wenchuan Ma, James L McGrath, Alexander A Shestopalov; **expected submission 02/2015**
2. “Switchable adhesion in flat and microstructured shape-memory polymers” So Youn Kim, Nan Liu, Alexander A Shestopalov, **expected submission 03/2015**
3. “Structure-property relation of organic monolayers inside large area organic diodes”, Yekaterina Lyubarskaya Y, Felipe F Angel, Ching W Tang, Alexander A Shestopalov; **expected submission 03/2015**
4. “Polyurethane-acrylate polymers in nanoimprint lithography”, Jinhai Li, Rui Shen, Alexander A Shestopalov; **expected submission 04/2015**
5. “Merocyanine monolayers in optically control interfacial charge transfer”, Ryan Green, Alexander A Shestopalov; **expected submission 04/2015**

### Published and Submitted

6. “Polyurethane-acrylate polymers in high-resolution contact printing”, Jinhai Li, Lisong Xu, So Youn Kim, Alexander A. Shestopalov; *Lab on a Chip*, **submitted**
7. “Polyurethane-Acrylate Polymers in Contact Printing of Organic Light Emitting Diodes”, Jinhai Li, Lisong Xu, Ching W Tang, Alexander A. Shestopalov; *ACS Applied Materials and Interfaces*, **submitted**
8. “Vapor-based carbenylation of Si-H and C-H terminated material interfaces”, Xunzhi Li, Wenchuan Ma, Alexander A Shestopalov, *Langmuir*, **submitted**
9. “Degradation of organic self-assembled monolayers inside organic photovoltaic devices”, Felipe F Angel, Yekaterina Lyubarskaya Y, Alexander A Shestopalov, Ching W Tang; *Organic Electronics*, **2014**, 15, 3624-3631
10. “Structural modifications in bilayered molecular systems lead to predictable changes in their electronic properties”, Carleen M Bowers, Minlu Zhang, Yekaterina Lyubarskaya, Ching W Tang, Alexander A Shestopalov; *Advanced Materials Interfaces*, **2014**, 1(2), 1300109

11. "Ultrathin Silicon Membranes for Wearable Dialysis", Dean G. Johnson, Tejas S. Khire, Yekaterina L. Lyubarskaya, Karl J. P. Smith, Jon-Paul S. DesOrmeaux, Jeremy G. Taylor, Thomas R. Gaborski, Alexander A. Shestopalov, Christopher C. Striemer, and James L. McGrath, *Advances in Chronic Kidney Disease*, **2013**, 20(6), 508–515.
12. "Multicomponent inorganic Janus particles with controlled compositions, morphologies, and chemical properties", Yekaterina L. Lyubarskaya, Alexander A. Shestopalov, *ACS Applied Materials and Interfaces*, **2013**, 5, 7323–7329
13. "Multicomponent patterning of indium tin oxide", Carleen M. Bowers, Alexander A. Shestopalov, Robert L. Clark, Eric J. Toone, *Applied Materials and Interfaces*, **2012**, 4(8), 3932 – 3936
14. "A general and efficient cantilever functionalization technique for AFM molecular recognition studies" Carleen M. Bowers, David A. Carlson, Alexander A. Shestopalov, Robert L. Clark, Eric J. Toone, *Biopolymers*, **2012**, 97(10), 761 – 765
15. "Soft Lithographic Functionalization and Patterning Oxide-free Silicon and Germanium", Carleen M. Bowers, Eric J. Toone, Robert L. Clark, Alexander A. Shestopalov, *Journal of Visualized Experiments*, **2011**, 58, 1–7.
16. "A soft-lithographic approach to functionalization and nanopatterning oxide-free silicon", Alexander A. Shestopalov, Carleen J. Morris, Briana N. Vogen, Amanda Hoertz, Robert L. Clark, Eric J. Toone, *Langmuir*, **2011**, 27(10), 6478 – 6485.
17. "Patterning NHS-terminated SAMs on Germanium", Carleen J. Morris, Alexander A. Shestopalov, Brian H. Gold, Robert L. Clark, and Eric J. Toone, *Langmuir*, **2011**, 27(10), 6486 – 6489.
18. "Inkless Microcontact Printing on SAMs of Boc- and TBS-Protected Thiols", Alexander A. Shestopalov, Robert L. Clark, Eric J. Toone, *Nano Letters*, **2010**, 10(1), 43 – 46.
19. "Catalytic microcontact printing on chemically functionalized H-terminated silicon", Alexander A. Shestopalov, Robert L. Clark, Eric J. Toone, *Langmuir*, **2010**, 26(3), 1449 – 1451.
20. "Combinatorial synthesis of substituted thieno[3,2-*b*]pyridines and other annulated heterocycles via New SN2 ->Thorpe-Ziegler ->Thorpe-Guareschi Domino Reactions" Anatoliy M. Shestopalov, Lyudmila A. Rodinovskaya, Alexander A. Shestopalov. *Journal of Combinatorial Chemistry*, **2010**, 12(1), 9 – 12.
21. "New Convenient Four-Component Synthesis of 6-Amino-2,4-dihydropyrano[2,3-*c*]pyrazol-5-carbonitriles and One-Pot Synthesis of 6'-Aminospiro[(3*H*)-indol-3,4'-pyrano[2,3-*c*]pyrazol]-(1*H*)-2-on-5'-carbonitriles" Yuri M. Litvinov, Alexander A. Shestopalov, Lyudmila A. Rodinovskaya, Anatoliy M. Shestopalov. *Journal of Combinatorial Chemistry*, **2009**, 11(5), 914 – 919.
22. "Microwave-assisted synthesis of substituted fluoroazines using KF\*2H<sub>2</sub>O", Anatoliy M. Shestopalov, Alexander E. Fedorov a, Liudmila A. Rodinovskaya, Alexander A. Shestopalov, Andrei A. Gakh, *Tetrahedron Letters*, **2009**, 50(37), 5257 – 5259.
23. "One-Step Synthesis of Substituted 3,5-Dicyanospiro-4-(piperidine-4')-1*H*,4*H*-dihydropyridine-2-thiolates and 2,6-Diamino-3,5-dicyanospiro-4-[(piperidine-4') or (2'-oxoindole-3')] -4*H*-thiopyrans", Anatoliy M. Shestopalov, Alexander A. Shestopalov, Lyudmila A. Rodinovskaya, Anna V. Gromova, Phosphorus, *Sulfur and Silicon and the Related Elements*, **2009**, 184(5), 1100-1114.

24. "Synthesis of 3-cyano-2-fluoropyridines", Anatoliy M. Shestopalov, Ludmila A. Rodinovskaya, Alexander E. Fedorov, Victor E. Kalugin, Kirill G. Nikishin, Alexander A. Shestopalov, Andrei A. Gakh, *Journal of Fluorine Chemistry*, **2009**, *130*, 236–240.
25. "One-Pot Synthesis of Diverse 4-Di(tri)fluoromethyl-3-cyanopyridine-2(1*H*)-thiones and Their Utilities in the Cascade Synthesis of Annulated Heterocycles", Lyudmila A. Rodinovskaya, Anatoliy M. Shestopalov, Anna V. Gromova, and Alexander A. Shestopalov, *Journal of Combinatorial Chemistry*, **2008**, *10*, 313–322.
26. "Versatile three-component synthesis of 2'-amino-1,2-dihydrospiro[(3*H*)-indole-3,4'-(4'*H*)-pyran]-2-ones" Valeriy Yu. Mortikov, Yuri M. Litvinov, Alexander A. Shestopalov, Lyudmila A. Rodinovskaya, Anatoliy M. Shestopalov. *Russian Chemical Bulletin*, **2008**, *57(11)*, 2373 – 2380.
27. "Inkless Microcontact Printing on Self-Assembled Monolayers of Fmoc-Protected Amino thiols", Alexander A. Shestopalov, Robert L. Clark, Eric J. Toone, *Journal of the American Chemical Society*, **2007**, *129*, 13818–13819.
28. "Preparation of chiral cyclopropanes with a carbohydrate fragment from levoglucosenone", Alexander V. Samet, Anatoliy M. Shestopalov, Dmitriy N. Lutov, Lyudmila A. Rodinovskaya, Alexander A. Shestopalov, Victor V. Semenov; *Tetrahedron Asymmetry*, **2007**, *18*, 1986–1989.
29. "Selective Peptide Chain Extension at the C-terminus of Aspartic and Glutamic Acids Utilizing *N*-protected ( $\alpha$ -aminoacyl)benzotriazoles", Alan R. Katritzky, Ekaterina Todadze, Alexander A. Shestopalov, Janet Cusido, Parul Angrish; *Chemical Biology and Drug Design*, **2006**, *68*, 42–47.
30. "Selective Peptide Chain Extension at the N-terminus of Aspartic and Glutamic Acids Utilizing 1-(*N*-protected- $\alpha$ -aminoacyl)benzotriazoles", Alan R. Katritzky, Ekaterina Todadze, Janet Cusido, Parul Angrish and Alexander A. Shestopalov; *Chemical Biology and Drug Design*, **2006**, *68*, 37–41.
31. "Substituted 4-(3-Cyanopyridin-2-ylthio)acetoacetates: New Convenient Reagents for the Synthesis of Heterocycles" Lyudmila A. Rodinovskaya, Anatoliy M. Shestopalov, Anna V. Gromova, Alexander A. Shestopalov, *Synthesis*, **2006**, *14*, 2357–2370.
32. "One-step synthesis of substituted 2-amino-5-oxo-4,5-dihydropyrano[3,2-*c*]chromenes", Aleksandr A. Shestopalov, Lyudmila A. Rodinovskaya, Anatoliy M. Shestopalov, Viktor P. Litvinov, *Russian Chemical Bulletin (International Edition)*, **2005**, *54(4)*, 992.
33. "A convenient synthesis of chiral 1,2,4-oxadiazoles from *N*-protected ( $\alpha$ -aminoacyl)benzotriazoles", Alan R. Katritzky, Aleksandr A. Shestopalov, Kazuyuki Suzuki, *ARKIVOC*, **2005**, *vii*, 36.
34. "One-step synthesis of 3-cyano-6-methyl-4-thienyl-5,6,7,8-tetrahydro[1,6]naphthyridine-2(1*H*)-thiones and annulated heterocyclic systems on their basis", Aleksandr A. Shestopalov, Anna V. Gromova, Lyudmila A. Rodinovskaya, Kiril G. Nikishin, Viktor P. Litvinov, Anatoliy M. Shestopalov, *Russian Chemical Bulletin (International Edition)*, **2004**, *53(10)*, 2352.
35. "Single-step synthesis of substituted 7-aminopyrano[2,3-*d*]pyrimidines", Aleksandr A. Shestopalov, Lyudmila A. Rodinovskaya, Anatoliy M. Shestopalov, and Viktor P. Litvinov, *Russian Chemical Bulletin (International Edition)*, **2004**, *53(10)*, 2342.

36. "A New Convenient Preparation of Thiol Esters Utilizing N-Acylbenzotriazoles", Alan R. Katritzky, Aleksandr A. Shestopalov, Kazuyuki Suzuki, *Synthesis*, **2004**, *11*, 1806–1813.
37. "One-step synthesis of substituted 4,8-dihydropyrano[3,2-*b*]pyran-4-ones", Aleksandr A. Shestopalov, Lyudmila A. Rodinovskaya, Anatoliy M. Shestopalov, and Viktor P. Litvinov, *Russian Chemical Bulletin (International Edition)*, **2004**, *53*(3), 724–725.
38. "Cross-condensation of derivatives of cyanoacetic acid and carbonyl compounds 2. One-pot synthesis of substituted 2-amino-7-methyl-5-oxo-4,5-dihydropyrano[4,3-*b*]pyrans in ethanol and ionic liquid [bmim][PF<sub>6</sub>]", Anatoliy M. Shestopalov, Sergey G. Zlotin, Aleksandr A. Shestopalov, Valeriy Yu. Mortikov, and Lyudmila A. Rodinovskaya, *Russian Chemical Bulletin (International Edition)*, **2004**, *53*(3), 573–579.
39. "A Convenient One-Pot Synthesis of Substituted 1,1-Dicyanocyclopropanes from Sulfonium Salts, Malononitrile, and Carbonyl Compounds", Aleksandr A. Shestopalov, Lyudmila A. Rodinovskaya, Anatoliy M. Shestopalov, Sergey G. Zlotin, and Vladimir Nesterov, *Synlett*, **2003**, *15*, 2309–2312.
40. "Cyclization of  $\alpha$ -Oxo-oximes to 2-Substituted Benzoxazoles", Alan R. Katritzky, Zuoquan Wang, C. Dennis Hall, Novruz G. Akhmedov, Aleksandr A. Shestopalov, and Peter J. Steel, *Journal of Organic Chemistry*, **2003**, *68*(23), 9093-9099.
41. "Structure elucidation of [1,3]oxazolo[4,5-*e*][2,1]benzoxazole and naphtho[1,2-*d*][1,3]- and phenanthro[9,10-*d*]oxazoles using gradient selected gHMBC, gHMQC and gHMQC-TOCSY NMR techniques", Alan R. Katritzky, Novruz G. Akhmedov, Zuoquan Wang, Vitaly A. Roznyatovsky, Aleksandr A. Shestopalov, and C. Dennis Hall, *Magnetic Resonance in Chemistry*, **2003**, *41*, 908–920.
42. "Cross-condensation of derivatives of cyanoacetic acid and carbonyl compounds. Part 1: Single-stage synthesis of 10-substituted 6-amino-spiro-4-(piperidine-4')-2*H*,4*H*pyrano[2,3-*c*]pyrazole-5-carbonitriles", Anatoliy M. Shestopalov, Yuliya M. Emel'yanova, Aleksandr A. Shestopalov, Lyudmila A. Rodinovskaya, Zuhra I. Niazimbetova, and Dennis H. Evans, *Tetrahedron*, **2003**, *59*, 7491–7496.
43. "One-Step Synthesis of Substituted 6-Amino-5-cyanospiro-4-(piperidine-4')-2*H*,4*H*-dihydropyrazolo[3,4-*b*]pyrans", Anatoliy M. Shestopalov, Yuliya M. Emel'yanova, Aleksandr A. Shestopalov, Lyudmila A. Rodinovskaya, Zuhra I. Niazimbetova, and Dennis H. Evans, *Organic Letters*, **2002**, *4*(3), 423–425.

### Literature Reviews

44. "Synthesis of Ring Fluorinated Pyridines", Anatoliy M. Shestopalov, Alexander A. Shestopalov, Lyudmila A. Rodinovskaya, Anna V. Gromova, in *Fluorinated Heterocyclic Compounds: Synthesis, Chemistry and Applications*; John Wiley & Sons, Inc, **2009**, 243-271 (chapter6).
45. "Synthesis and reactions of fluorinated nicotinonitriles", Anatoliy M. Shestopalov, Lyudmila A. Rodinovskaya, Alexander A. Shestopalov, Anna V. Gromova, Alexander E. Fedorov, Andrey A. Gakh, In: *Fluorinated Heterocycles*; AA Gakh, KL Kirk, Eds.; ACS Symposium Series 1003; Oxford University Press/American Chemical Society: Washington, DC, **2009**, 263-280.
46. "Seven-membered and larger heterocyclic rings containing phosphorus", Anatoliy M. Shestopalov, Alexander A. Shestopalov, in *Comprehensive Heterocyclic Chemistry III*, AR

Katritzky, CA Ramsden, EFV Scriven and RJK Taylor, Eds.; Elsevier: Oxford, **2008**, *14*, 901-944 (chapter 17).

47. "Multicomponent Reactions of Carbonyl Compounds and Derivatives of Cyanoacetic Acid: Synthesis of Carbo- and Heterocycles", Anatoliy M. Shestopalov, Alexander A. Shestopalov, Lyudmila A. Rodinovskaya, *Synthesis*, **2008**, *1*, 1-25.