

David Spivak: Professional CV

Table of Contents

1. Curriculum Vitae

Synergistic Activities.....	3
Overall Service Listing.....	4
Publications.....	5
Funding Support.....	9
Consulting.....	10
Invited Presentations.....	11
Presentations at Professional Meetings.....	12
Patents.....	12

2. Research

Current Research Summary.....	14
Research Collaborators at Louisiana State University:.....	17

3. Teaching Summary

Educational Awards.....	19
Courses Taught and Evaluations.....	19
Course Development.....	21
Other Educational Developments.....	21
Future Educational Goals.....	22

4. Appendices

Appendix item 1: Letter of commendation for Teaching Excellence from Dean of the College of Science.....	23
Appendix item 2: Top Cited Article in Analytical and Bioanalytical Chemistry in 2008.....	24
Appendix item 3. Review in Wiley publisher “ChemistryViews” online highlights page.....	25
Appendix item 4. Appreciation letter for serving as judge for the Louisiana Science and Engineering Fair.....	26
Appendix item 5. Materials for German-American Frontiers in Science Symposium.....	27
Appendix item 6. Copies of Local and National Media Coverage for Awards and Honors.....	29
Appendix item 7. Certificate of ACS Ambassador for 2013 and 2014.....	31
Appendix item 8. International Reputation.....	32

I. *Curriculum Vitae* - David A. Spivak

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Education: B.S. in Chemistry, University of California, Berkeley, 1989
Ph.D. in Polymer/Organic Chemistry, University of California, Irvine, 1995; Research Advisor: Kenneth J. Shea

NIH Post-Doctoral Fellow, The Scripps Research Institute, 1995-1998
Sponsor: Kim D. Janda

Professional

History: 2004-present Associate Professor of Chemistry, LSU
1998-2004 Assistant Professor of Chemistry, LSU
1995-1998 Research Associate, The Scripps Research Institute

Awards &

Honors: Plenary Lecture: MIP2006; 4th Biennial Molecular Imprinting Symposium (2006)
National Academy of Sciences - Alexander Von Humboldt Foundation: 9th Annual German-American Frontiers of Science; Invited Speaker (2003)
NSF CAREER Award (2002)
Research Corporation Cottrell Scholar Award (2001)
Louisiana State University Tiger Athletic Foundation Undergraduate Teaching Award (2001)
Oak Ridge Associated Universities, Ralph E. Powe Junior Faculty Enhancement Award (2000)
NIH Post-Doctoral Fellowship Recipient. Awarded Proposal: "First Polymerization Catalyzed by an Antibody," (1995-1997)
The ISPPP Honorary Student Speaker (International Symposium of Peptides, Proteins and Polynucleotides, 1993)

Research

Interests: Molecularly imprinted polymers, hydrogels and surfaces for biological and environmental analysis. Synthesis of engineered surrogate soils

Professional

- Activities:**
1. 2010-Present: Faculty advisor to the LSU's Student American Chemical Society chapter, chapter won "Honorable Mention" in 2012; and "Commendable Chapter" in 2013.
 2. 2007-Present: Associate Editor, Journal of Molecular Recognition
 3. 2011- Present: Associate Editor of the Journal of Molecular Imprinting
 4. 2006-Present: Member of the Advisory Board for the Society of Molecular Imprinting
 5. 2012-Present: Co-PI and Co-director for Chemistry iREU Program "REU Site: The US/France/Belgium iREU Site in Translational Chemistry
 6. 1998-Present: Member of the American Chemical Society

Ph.D's Granted (7): Martha Sibrian-Vazquez, Hyunjung Kim, Ryan Simon, Jason LeJeune, Nick Gariano, Wei Bai, Danielle Meador

M.S.'s Granted (5): Melissa Collins, Jason Campbell, Andrea Dupre, Mrunal Thatte, Temeeka Kennedy

Advisors:

Graduate Advisor: Professor Kenneth J. Shea (University of California, Irvine)

Post-Doctoral Sponsor: Professor Kim D. Janda (The Scripps Research Institute)

Synergistic Activities:

1. Chair of the Following Conferences:
 - (a) "Functional Materials Based on Complex Macromolecular Architectures"; 2012 SWRM (Southwest Regional Meeting of the American Chemical Society) in Baton Rouge, Co-Chaired by Evgueni Nesterov.
 - (b) "MIP2010: The Future of Molecular Imprinting", Responsible for all organization of this international meeting. MIP20XX meetings are international and held biennially; the MIP2010 was held in New Orleans, the first and only destination ever in America.
2. Provided research consulting support for Seacoast Science, Inc. (Carlsbad, CA.), Physical Optics Corporation (Torrance, CA.), Constellation Brands., Inc. (Victor, NY).
3. Referee for research articles submitted to the following journals: *JACS*, *Macromolecules*, *Langmuir*, *Organic Letters*, *JOC*, *Angewandte Chemie*, *J. Chromatography*, *Nanoletters*, *Chemical Communications*, *J. of Sensors and Actuators*, *J. Molecular Recognition*, *Analytical Chemistry*, *Analytica Chimica Acta*, *Journal of Polymer Chemistry*, *Israeli Journal of Chemistry*, *Synlett*, *Tetrahedron*, *Journal of Organometallic Chemistry*
4. Participated in NSF 2012 CBET Grantee Conference with the purpose of building more effective and collaborative relationships amongst the community of CBET grantees and Program Directors

Overall Service Listing

Departmental Service

1. Recruiting Committee (1999-2007)
2. Undergraduate Awards and Affairs Committee (2000-2011)
3. Departmental Safety Committee (2014)
4. Advisor to the Student Affiliates of the American Chemical Society (2010-2014)
5. Strategic Planning Committee for the LSU Chemistry Department (2010)
6. Advisor for the Chemistry Graduate Student Council (2014)
7. Faculty Search Committees (several); Committee chair leading to the hire of Carol Taylor (2006); Committee chair leading the hire of Donghui Zhang (2009).
8. Division Leader for the LSU Chemistry Macromolecular division (2008-2010)
9. Division Leader for the LSU Chemistry Organic division (2008-2009)
10. Served on over 40 graduate student Ph.D. committees
11. Equipment Enhancement Grant for LSU NMR Facility, 2002
12. Macromolecular Faculty Search Committee 2000, 2014
13. Analytical Faculty Search Committee; 2001
14. Organic Faculty Search Committee; 2001

College Service

1. Docent for Basic Sciences Graduation Ceremony in December of 2004

University Service

1. Served on 2-day interview panel for HHMI-LaSTEM candidates, directed by Isiah Warner (2010).

Service to the Community

1. ACS Chemistry Ambassador, promoting the value of chemists and chemistry to the community (2013 & 2014; see appendix 7).
2. Chemistry Demo's at various local schools and LSU events.
3. Served as judge for "You be the Chemist Challenge", a national academic contest that encourages grade 5-8 students to explore important chemistry and STEM concepts, organized by the Chemical Educational Foundation. (2007-2009)
4. Served as judge for the Louisiana Science and Engineering Fair (2009, see appendix 4)

Service to Profession

1. Tenure Review Panel Member for Lou Ann Tom, Professor of Chemistry, Susquehanna University (2012).
2. Recommendation letter for the successful PMSE Fellowship awarded to Kenneth J. Shea (2013).

Publications:

1. Bai, Wei; Spivak, David A. "A Double-Imprinted Diffraction-Grating Sensor Based on a Virus-Responsive Super-Aptamer Hydrogel Derived from an Impure Extract" *Angewandte Chemie International Edition*, **2014**, 53, 2095–2098.
2. Krupadam, R. J.; Nesterov, E. E.; Spivak, D. A., Highly selective detection of oil spill polycyclic aromatic hydrocarbons using molecularly imprinted polymers for marine ecosystems. *J. Hazard. Mater.* **2014**, 274, 1-7
3. Berton, P.; Regmi, B. P.; Spivak, D. A.; Warner, I. M., Ionic liquid-based dispersive microextraction of nitrotoluenes in water samples. *Microchimica Acta*, **2014**, 181, 1191-1198.
4. Meador, Danielle; Spivak, David A. "Absolute Configuration Determination Using Enantiomeric Pairs of Molecularly Imprinted Polymers" *Organic Letters*, **2014**, 16, 1402–1405.
5. Bai, Wei; Gariano, Nicholas A.; Spivak, David A. "Macromolecular Amplification of Binding Response in Superaptamer Hydrogels" *Journal of the American Chemical Society* **2013**, 135, 6977-6984.
6. Balamurugan, Subramanian; Mayer, Kathryn M.; Lee, Seunghyun; Soper, Steven A.; Hafner, Jason H.; Spivak, David A. "Nanostructure shape effects on response of plasmonic aptamer sensors" *Journal of Molecular Recognition*, **2013**, 26, 402-407.
7. Astete, Carlos E.; Songe Meador, Danielle; Spivak, David; Sabliov, Cristina; "Synthesis of Vitamin E-Carnosine (Vecar): New Antioxidant Molecule with Potential Application in Atherosclerosis" *Synthetic Communications*, **2013**, 43, 1299-1313. DOI:10.1080/00397911.2011.632829.
8. Spivak, David A. "Enantioseparations by high-performance liquid chromatography using molecularly imprinted polymers" *Methods in Molecular Biology*; Scriba, Gerhard K.; Ed.; Springer, New York, NY, USA; **2013**, 970 (Chiral Separations), 209-220.
9. Horemans, F.; Weustenraed, A.; Spivak, D.; Cleij, T. J., "Towards water compatible MIPs for sensing in aqueous media" *Journal of Molecular Recognition*, **2012**, 25, 344-351.
10. Spivak, David A.; Shea, Kenneth J., "Editorial: MI2010: The Future of Molecular Imprinting" *Journal of Molecular Recognition* **2012**, 25, 319.
11. Tiwari, Rajesh; Spivak, David A., "Kinetics and mechanism of the charge-transfer polymerization of methyl methacrylate initiated with n-butyl amine and carbon tetrachloride catalyzed by palladium dichloride" *Journal of Applied Polymer Science*, **2012**, 124, 4025-4032.
12. Subramanian Balamurugan, Spivak, David A.; "Molecular Imprinting in Monolayer Surfaces" *Journal of Molecular Recognition*, **2011**, 24, 915–929.
13. Subramanian, Balamurugan; Kim, Namwon; Lee, Wonbae; Spivak, David A.; Nikitopoulos, Dimitris E.; McCarley, Robin L.; Soper, Steven A.; "Surface Modification of Droplet Polymeric Microfluidic Devices for the Stable and Continuous Generation of Aqueous Droplets" *Langmuir* **2011**, 27, 7949-7957.
14. LeJeune, Jason; Spivak, David A.; "Analyte separation by OMNiMIPs imprinted with multiple templates." *Biosensors & Bioelectronics* **2009**, 25, 604-608.

15. Yoshimatsu, Keiichi; LeJeune, Jason; Spivak, David A.; Ye, Lei. "Peptide-imprinted polymer microspheres prepared by precipitation polymerization using a single bi-functional monomer." *Analyst*, **2009**, 134, 719-724. DOI: 10.1039/b814967d
16. Reed, Neal N.; Spivak, David A.; "A practical synthesis of (11-mercaptopoundecyloxy)-triethylene glycol: A valuable precursor for multicomponent self-assembled monolayers." *Journal of Sulfur Chemistry* **2009**, 30, 477-480.
17. Meng, Andrew C.; Le Jeune, Jason; Spivak, David A.; "Multi-analyte imprinting capability of OMNiMIPs versus traditional molecularly imprinted polymers." *Journal of Molecular Recognition*, **2009**, 22, 121-128.
18. Balamurugan, Subramanian; Obubuafo, Anne; McCarley, Robin L.; Soper, Steven A.; Spivak, David A.; "Effect of Linker Structure on Surface Density of Aptamer Monolayers and Their Corresponding Protein Binding Efficiency." *Analytical Chemistry*, **2008**, 80, 9630-9634.
19. Balamurugan, Subramanian; Obubuafo, Anne; Soper, Steven A.; Spivak, David A.; "Surface immobilization methods for aptamer diagnostic applications." *Anal. Bioanal. Chem.*, **2008**, 390, 1009-1021.
20. Obubuafo, Anne; Balamurugan, Subramanian; Shadpour, Hamed; Spivak, David; McCarley, Robin L.; Soper, Steven A.; "Poly(methyl methacrylate) microchip affinity capillary gel electrophoresis of aptamer-protein complexes for the analysis of thrombin in plasma." *Electrophoresis*, **2008**, 29, 3436-3445
21. LeJeune, Jason; Spivak, David A.; "Chiral effects of alkyl-substituted derivatives of N,O-bismethacryloyl ethanolamine on the performance of one monomer molecularly imprinted polymers (OMNiMIPs)." *Anal. Bioanal. Chem.*, **2007**, 389, 433-440.
22. Simon, Ryan; Collins, Melissa E.; Spivak, David A.; "Shape selectivity versus functional group preorganization in molecularly imprinted polymers." *Anal Chim Acta*, **2007**, 591, 7-16.
23. Balamurugan, S.; Obubuafo, A.; Soper, S. A.; McCarley, R. L.; Spivak, David A.; "Designing Highly Specific Biosensing Surfaces Using Aptamer Monolayers on Gold," *Langmuir*, **2006**, 22, 6446-6453.
24. Spivak, David A.; Sibrian-Vazquez, M.; Houck, S.; "Development of one monomer molecularly imprinted polymers (OMNiMIPs)," *Polymer Preprints*, **2005**, 46, 1103-1104.
25. Spivak, David A.; "Optimization, evaluation, and characterization of molecularly imprinted polymers." *Advanced Drug Delivery Reviews*, **2005**, 57, 1779-1794.
26. Spivak, David A.; "Selectivity in Molecularly Imprinted Polymers," Chapter in *Molecularly Imprinted Materials, Science and Technology*; M. Yan, O. Ramstrom, Eds.; Marcel Dekker, New York, **2005**, 395-417.
27. Simon, Ryan; Houck, Stephen; Spivak, David A.; "Comparison of particle size and flow rate optimization for chromatography using one-monomer molecularly imprinted polymers versus traditional non-covalent molecularly imprinted polymers." *Anal. Chim. Acta*, **2005**, 542, 104-110.
28. Spivak, D., "Improved strategy for molecular imprinting.", *Letters in Organic Chemistry* **2005**, 2(1), 2.
29. Sibrian-Vazquez, M.; Spivak, D.A.; "Molecular Imprinting Made Easy," *J. Am. Chem. Soc.* **2004**, 126, 7827-7833.

30. Spivak, D.A.; Simon, R.; Campbell, J.; "Evidence for Shape Selective Cavity Formation in Molecularly Imprinted Polymers," *Anal. Chim. Acta*, **2004**, *504*, 23-30.
31. Sibrian-Vazquez, M.; Spivak, D.A.; "Characterization of Novel Materials for Molecularly Imprinted Polymers using Hybrid Crosslinking Monomers," *Journal of Polymer Science, Part A: Polymer Chemistry*, **2004**, *42*, 3668-3675.
32. Simon, R.; Spivak, D.A.; "Performance Analysis of MIPs for Carboxylate and Aminophosphate Templates using Commercially Available Basic Functional Monomers," *J. Chromatogr. B*, **2004**, *804*, 203-209.
33. Spivak, David A.; "MIPs in Biotechnology, Perspective and Reality," Chapter in: *Molecular Imprinting of Polymers*; S. Piletsky, I. Nicholls, Eds., **2004**, Landes Bioscience, <http://www.landesbioscience.com/lu/output.php?id=358>.
34. Spivak, D. A.; "A New Mechanistic Diagram for Molecularly Imprinted Polymers," *MRS Symposium Proceedings*, **2004**, Volume Date 2003, 787, 23-28.
35. Kim, Hyunjung; Spivak, David A.; "New Insight into Modeling Non-Covalently Imprinted Polymers," *J. Am. Chem. Soc.* **2003**, *125*, 11269-11275.
36. Kim, H.; Spivak, D. A.; "An Orthogonal Approach to Multifunctional Molecularly Imprinted Polymers," *Org. Lett.* **2003**, *5*, 3415-3418.
37. Sibrian-Vazquez, M.; Spivak, D.A.; "Enhanced Enantioselectivity of Imprinted Polymers Formulated with Novel Crosslinking Monomers," *Macromolecules* **2003**, *36*, 5105-5113.
38. Sibrian-Vazquez, M.; Spivak, D.A.; "Improving the Strategy and Performance of Molecularly Imprinted Polymers using Crosslinking Functional Monomers," *J. Org. Chem.* **2003**, *68*, 9604-9611.
39. Spivak, D.A.; Simon, R.; Sibrian-Vazquez, M.; Campbell, J.; "Shape selectivity in non-covalently imprinted polymers," *Polymer Preprints*, **2003**, *44*, 657-658.
40. Spivak, D.A.; Kim, H.; "Influence of template-monomer ratio on binding sites within molecular imprinted polymers," *Polymer Preprints*, **2003**, *44*, 661-662.
41. Spivak, D.A.; Sibrian-Vazquez, M.; "Development of Novel Crosslinking Monomers for Molecularly Imprinted Polymers," *MRS Bulletin*, **2002**, *723*, 5-10.
42. Spivak, D.A.; Sibrian-Vazquez, M.; "Development of an Aspartic-Acid Based Cross-Linking Monomer for Improved Bioseparations," *Bioseparation*, **2002**, *10*, 331-336.
43. Sibrian-Vazquez, M.; Spivak, D.A.; "A convenient synthesis of 3-(S)-amino- γ -butyrolactone," *Synlett* **2002**, *7*, 1105-1106.
44. Spivak, D.A.; Campbell, J.; "Systematic Study of Steric and Spatial Contributions to Molecular Recognition by Non-Covalent Imprinted Polymers," *Analyst* **2001**, *126*, 793-797.
45. Spivak, D.A.; Shea, K.J.; "Investigation into the Scope and Limitations of Molecular Imprinting with DNA Molecules," *Anal. Chim. Acta.* **2001**, *435*, 65-74.
46. Spivak, D.A., Hoffman, T., Janda, K.J.; "A Comparison of Flexible and Constrained Haptens in Eliciting Antibody Catalysts for Paraoxon Hydrolysis," *Bioorg. Med. Chem.* **1999**, *7*, 1145-1150.
47. Spivak, D.A.; Shea, K.J.; "Molecular Imprinting of Carboxylic Acids Employing Novel Functional Macroporous Polymers," *J. Org. Chem.* **1999**, *64*, 4627-4634.
48. Spivak, D.A.; Shea, K.J.; "Binding of Nucleotide Bases by Molecularly Imprinted Polymers," *Macromolecules* **1998**, *31*, 2160-2165.

49. Spivak, D.A.; Shea, K.J.; "Evaluation of Binding and Origins of Specificity of 9-Ethyladenine Imprinted Polymers," *Journal of the American Chemical Society* **1997**, *119*, 4388-4393.
50. Shea, K.J.; Spivak, D.A.; Selligren, B.; "Polymer Complements to Nucleotide Bases. Selective Binding of Adenine Derivatives to Imprinted Polymers," *Journal of the American Chemical Society* **1993**, *115*, 3368-3369.

Funding Support: Awards total over \$4,300,000 USD in funding grants, either as the Primary Investigator or Co-Primary Investigator.

Current:

1. NSF-CHE-ECS: "Collaborative Research: Gaining a molecular level understanding of the sorption of model organic molecules to engineered soil surrogates", Co-PI: David Spivak; PI: Robert Cook; Co-PI: Karl Mueller; 07/01/14 - 01/01/17, \$711,074; **DMR-1411547**
2. NSF-REU: "REU Site: The US/France/Belgium iREU Site in Translational Chemistry," Co-PI: David Spivak, PI: Randy Duran, 05/01/13 - 09/01/15, \$442,598; **CHE-1263336**

Pending:

1. NSF-DMR: "Macromolecular amplification of binding response in sensor hydrogels", PI: David Spivak, 05/01/15 - 09/01/18, \$421,761; **DMR-1410843**
2. NIH-NIAID, R21/R33: "Responsive Hydrogels for Detection of Ebola and Other Febrile Illnesses", PI: David Spivak, 9/01/2015 – 8/31/2020; \$1,003,351; **1R21AI120982-01**.

Past:

1. NSF-Chemical, Biological, Environmental, and Transport Systems (CBET): "New Molecularly Imprinted Polymers with Significantly Enhanced Properties for Chemical and Biological Analyses and Separations," PI: David Spivak, Co-PI: Evgueni Nesterov. 9/31/2009-9/29/2013, \$286,354, **CBET-0854105**.
2. Analytical Studies Using Ionic Liquids (PI: Isiah Warner, Co-PI: David Spivak, Co-PI: Min Li), \$801,147, 9/13/2009 - 05/1/2012 **CHE- 0911118**
3. Conference: Graduate Student Support to Attend the Conference, MIP2010: The Future of Molecular Imprinting, August 8-12, 2010, New Orleans, LA; \$10,000 **CBET-1039613**
4. Petroleum Research Fund: "Synthesis and Development of Novel Bis-Siloxy Arenes For Functionalized Magnetic Nanoparticles." PI: David Spivak, 1/31/2009-1/29/2011, \$100,000; **PRF# 48845 -ND 1**

5. NSF CAREER Program: "Development of Polymerizable Diacetylene Surfactant Monomers for Two-Dimensional Imprinting and Sensors," **CHE-0134290**, 6/1/02 - 5/1/08, \$369,469, PI: David A. Spivak.
6. NIH-NCI: "Microsampling Unit for Capturing Low Abundant Cells," **1 R21 CA099246-01**, 1/1/04 - 12/31/08, \$1,645,491; PI: Steven Soper, Co-PI: David A. Spivak
7. NSF-REU Program: "REU Site: Research Experiences for a Diverse Cadre of Undergraduates in Environmental, Biological and Materials Chemistry," **CHE-0648841**, 4/30/2007 – 6/30/09, \$278,277, PI: David Spivak,
8. LSU Council on Research- Faculty Research Grant: "Nanobumps: Control of Polymer Morphology and Porosity on Surfaces"; \$10,000, 7/1/2006 – 6/30/2007
9. Research Corporation, Cottrell Scholar Award, "Controlling the Molecular Architecture of Functionalized Organic Materials using Fluoro-Organic Mesophases," **CS0801**, 6/1/01 -5/1/06, \$75,000, PI: David A. Spivak.
10. NIH-INRSA: "Stereo-controlled Polymerization Catalyzed by an Antibody," **NIGMS# GM-17822**, \$46,400; 10/95 -10/97, awarded to David A. Spivak, The Scripps Research Institute, La Jolla, CA.
11. NSF CRIF program: "Purchase of Gas Adsorption and Mercury Intrusion Porosimeters for Surface Area and Pore Analysis of New Organic Polymer Network Materials" **CHE-9816555**, 7/1/99-9/1/00, \$36,500, PI: David A. Spivak.
12. LSU Council on Research Summer Stipend Program: "Combinatorial Libraries of Network Peptide Polymers for Use as Artificial Receptors, Catalysts and Chromatographic Supports" 7/1/99-7/31/99, \$5,000.00, PI: David A. Spivak.
13. ACS-PRF Type G Grant: "Combinatorial Libraries of Network Peptide Polymers for Use as Artificial Receptors, Catalysts and Chromatographic Supports" **ACS-PRF#34485-G7**; 9/1/99-8/31/01, \$25,000, PI: David A. Spivak.
14. Oak Ridge Associated Universities, Ralph E. Powe Junior Faculty Enhancement Award: "Nano-imprinting: Formation of Molecularly Imprinted Nanoparticles," 6/1/00-5/31/03, \$10,000, PI: David A. Spivak.
15. Atairgen Technologies, Inc. "Proof of a Molecular Imprinting Theory," 8/1/01 - 12/1/01; \$16,586, PI: David A. Spivak.
16. Louisiana Board of Regents, LEQSF Enhancement Grant Proposal: "Equipment for NMR Facility Enhancement: Application to Materials Science," **LEQSF (2001-02)-ENH-TR-19**, 9/1/02 - 8/31/04, \$31,600, PI: David A. Spivak.
17. Louisiana Board of Regents, LEQSF Research Competitiveness Program: "High Through-

Put Parallel Synthesis of Molecularly Imprinted Polymers for Protein Mimics, **LEQSF (2002-05)-RD-A-11**, 9/1/02 - 8/31/05, \$142,500, PI: David A. Spivak.

Consulting:

Guest Lecturer: "Spectroscopy of Polymers," March, 2001, Society of Plastics Engineers, Louisiana State University, Baton Rouge.

Consultant to Atairgen Technologies, Inc.; Irvine, CA. "Proof of a Molecular Imprinting Theory." Contact: Kiu Leung.

Consultant to BASF Chemicals; Geismar, LA. "Determining the Origin of Inhibition in the Polyvinylpyrrolidinone Synthesis Process." Contact: Huston Howell

Consultant to The Center for Food and Nutrition Policy, Virginia Tech, Blacksburg, Virginia, "Bismuth subsalicylate for use in livestock", Contact: Maria Von Tersch

Consultant to Seacoast Science, Inc., Carlsbad, CA. "Imprinted Polymer Nanoparticles for Explosives Detection," Contact. Stephen Hobson, Program Director

Consultant to Physical Optics Corporation, Torrance, CA. "Propofol Imprinted Polymers" Contact. Kenneth Levin, Program Director

Consultant to Constellation Brands, New York, NY. "Guaiacol Separation", Contact: Mark Kelm, Program Associate

Invited Lectures:

1. David A. Spivak, Jackson State University, MS, "Design and Development of Molecularly Imprinted Polymers" (2013)
2. David A. Spivak, Dalian Institute of Chemical Physics, International Forum on Molecular Imprinting, "Development of New Crosslinking Technology for Molecularly Imprinted Polymers" (2011)
3. David A. Spivak, Oklahoma State University, OK, "Bio-Mimetic Receptors Using a Molecular Template in Polymers, Hydrogels, and Self-Assembled Monolayers" (2010)
4. David A. Spivak, Aegean Conferences: 1st International Conference on Molecular Recognition, "Bio-Mimetic Receptors Using a Molecular Template in Polymers, Hydrogels, and Self-Assembled Monolayers" (2009)
5. David A. Spivak, National Environmental Engineering Research Institute, Nagpur, India "Novel Approaches to Molecular Imprinting In Different Matrices" (2009)
6. David A. Spivak, Jackson State University, MS, "Discovery and Development of OMNiMIPs: One MoNomer Molecularly Imprinted Polymers (2008)
7. David A. Spivak, Kalmar University, Sweden "Discovery and Development of OMNiMIPs: One MoNomer Molecularly Imprinted Polymers (2008)
8. David A. Spivak, Kalmar University, Sweden "Discovery and Development of OMNiMIPs: One MoNomer Molecularly Imprinted Polymers (2008)

9. David A. Spivak, MIP Technologies, "OMNiMIPs: One MoNomer Molecularly Imprinted Polymers," (2008) Lund, Sweden,
10. David A. Spivak, MRS Special Session Q: "Discovery and Development of OMNiMIPs: One MoNomer Molecularly Imprinted Polymers," Advances in Photo-Initiated Polymer Processes and Materials (2007), San Francisco, California
11. David A. Spivak, University of Southern Mississippi, "OMNiMIPs: One MoNomer Molecularly Imprinted Polymers," (2007) Hattiesburg, Mississippi
12. David A. Spivak, University of California at Merced "Synthesis of Smart Polymer Materials for Bio-Analytical Applications," (2007), Merced, California
13. David A. Spivak, Plenary Lecture: "MIPs: The Matrix Revisited"; MIP2006; 4th Biennial Molecular Imprinting Symposium, September 2006, Cardiff, England
14. David A. Spivak, "Development of OMNiMIPs: One MoNomer Molecularly Imprinted Polymers," August, 2006, 62nd Southwest Regional Meeting (SWRM) ACS National Meeting, Houston, TX.
15. David A. Spivak, "Discovery and Development of OMNiMIPs," May 2006, Tulane University, New Orleans, Louisiana
16. David A. Spivak, "The Map of Organic Chemistry," July 2004, Research Corporation, Tucson, Arizona.
17. David A. Spivak, "How Molecular Imprinting Works," June, 2003, National Academy of Sciences, Irvine, California, USA.
18. David A. Spivak, "Molecular Imprinting of Biological Molecules and Investigation into the Origins of Binding," May, 2003, University of Southern Mississippi, Hattiesburg, MS.
19. David A. Spivak, "How Molecular Imprinting Works" March 2003, Bradley University, Peoria, IL.
20. David A. Spivak, "Spectroscopy of Polymers," March, 2001, Society of Plastics Engineers, Louisiana State University, Baton Rouge, LA.
21. David A. Spivak, "Molecular Imprinting of Biological Molecules and Investigation into the Origins of Binding," May, 2000, McNeese State University, Lake Charles, LA.
22. David A. Spivak, "Molecular Imprinting of Biological Molecules and Investigation into the Origins of Binding," May, 2000, University of Southern Mississippi, Hattiesburg, MS.
23. David A. Spivak, "Fundamentals of Molecular Imprinting " July, 1999, Oak Ridge National Laboratory, Oak Ridge, TN.
24. David A. Spivak, "Molecular Recognition and Catalysis using Synthetic and Biological Polymers", January 1998, University of Florida, Gainesville, FL.
25. David A. Spivak, "Molecular Recognition and Catalysis using Synthetic and Biological Polymers", February 1997, University of Michigan, Ann Arbor, MI.
26. David A. Spivak, "Molecular Recognition and Catalysis using Synthetic and Biological Polymers", December 1997, University of Arizona, Tucson, AZ.

Presentations at Professional Meetings:

1. David A. Spivak, MIP2014 Symposium, Jiangsu, China, "Aptamers as Functional Monomers for Molecular Imprinting in Hydrogels and Self-Assembled Monolayers", (2014)

2. David A. Spivak, MIP2012 Symposium, Paris, France, "Aptamers as Functional Monomers for Molecular Imprinting in Hydrogels and Self-Assembled Monolayers", (2012)
3. David A. Spivak, SWRM (Southwest Regional Meeting of the American Chemical Society), Baton Rouge, LA "Synthesis of imprinted hydrogels for detection of Thrombin and Platelet Derived Growth Factor" (2012)
4. David A. Spivak, ACS National Meeting, Anaheim, CA "Novel Approaches to Molecular Imprinting In Different Matrices" (2011)
5. David A. Spivak, SWRM (Southwest Regional Meeting of the American Chemical Society), Austin, TX "MIPs: The Matrix Revisited" (2011)
6. David A. Spivak, MIP2010 Symposium, New Orleans, LA "Aptamers as Functional Monomers for Molecular Imprinting in Hydrogels and Self-Assembled Monolayers", August, 2010
7. David A. Spivak, ACS National Meeting, New Orleans, LA "Discovery and Development of OMNiMIPs: One MoNomer Molecularly Imprinted Polymers," 2008,
8. David A. Spivak, MIP2008 Symposium, Kobe University, Japan "Discovery and Development of OMNiMIPs: One MoNomer Molecularly Imprinted Polymers," October 2008
9. David A. Spivak, AFFINITY2007 "Discovery and Development of OMNiMIPs: One MoNomer Molecularly Imprinted Polymers," (2007) New York, New York
10. David A. Spivak, "Development of OMNiMIPs: One MoNomer Molecularly Imprinted Polymers," August, 2005, 230th ACS National Meeting, Washington, D.C.
11. David A. Spivak, "OMNiMIPs: One MoNomer Molecularly Imprinted Polymers," March, 2005, 229th ACS National Meeting, San Diego, CA.
12. David A. Spivak, "OMNiMIPs: One MoNomer Molecularly Imprinted Polymers," September, 2004, MIP2004 Symposium, University of Cardiff, Cardiff, England
13. David A. Spivak, "New Insight from Modeling Noncovalently Imprinted Polymers," October, 2003, Synthetic Receptors 2003, The First World Congress on Synthetic Receptors, Lisbon, Portugal.
14. David A. Spivak, "Impact of Shape Selectivity in Molecularly Imprinted Polymers," March, 2003, 225th ACS National Meeting, New Orleans, LA.
15. David A. Spivak, "Impact of Shape Selectivity in Molecularly Imprinted Polymers," March, 2003, 225th American Physical Society National Meeting, Austin, TX.
16. David A. Spivak, "Development of Novel Crosslinking Monomers for Molecularly Imprinted Polymers," March, 2002, MRS National Meeting, San Francisco, CA
17. David A. Spivak, "Steric Contributions to Molecular Imprinting in Non-Covalent Imprinted Polymers," September, 2002, MIP2002, Montpellier, France.
18. David A. Spivak, "Development of novel crosslinking monomers for molecularly imprinted polymers." October, 2001, 221st ACS National Meeting, San Diego, CA.
19. David A. Spivak, "Investigation into the Scope and Limitations of Molecular Imprinting with DNA Molecules," June, 2000, MIP2000, University of Cardiff, Cardiff, England.

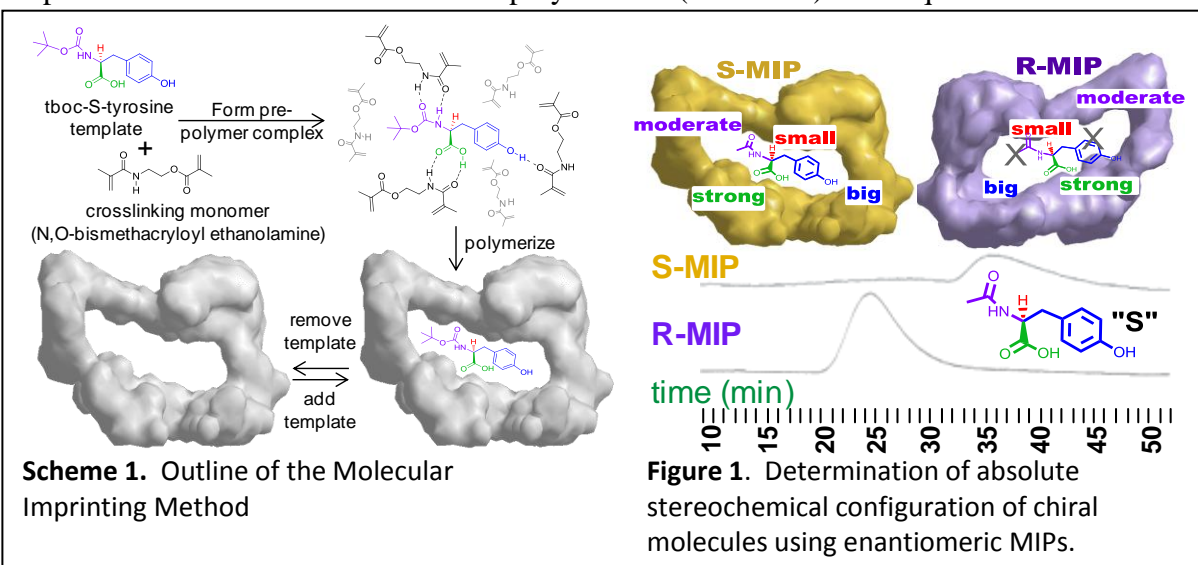
Patents:

1. Spivak, David A. **Palladium-catalyzed cross-coupling of aryldiazonium salts with arylsilanes.** U.S. Pat. Appl. Publ. (2003), 8 pp. US 2003120124 A1 20030626; CAN 139:69042; AN 2003:492754



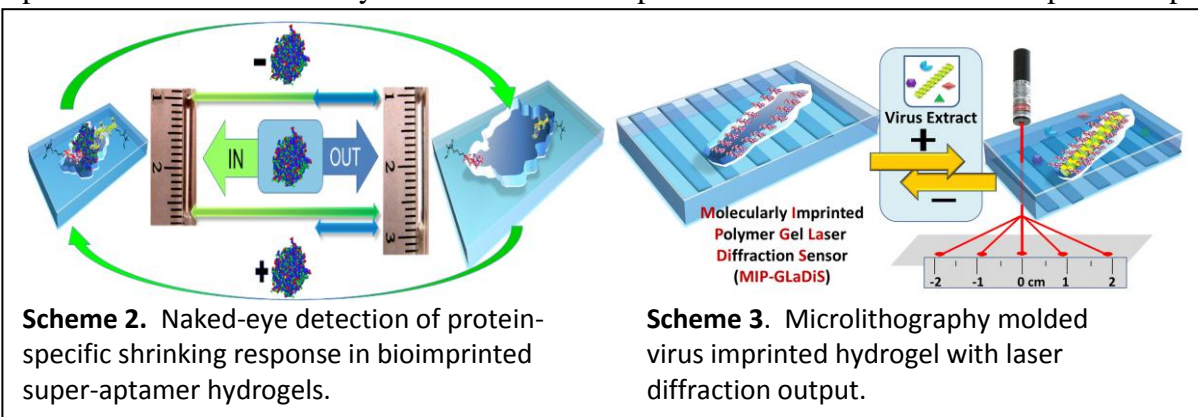
Spivak Group Current Research Summary

Our research can be broadly characterized as “Analytical Materials”, which is defined to be polymers and other materials that are used as a component of analytical assays, sensors, separation media, or models for complex systems. To develop these materials we often use Molecularly Imprinted Polymers (MIPs), which are formed using a template molecule complexed to interactive monomers and polymerized (Scheme 1). Subsequent removal of the



template leaves a specific binding cavity that selectively rebinds the template versus any other molecule. There are now tens of thousands of publications on the subject, but few introduce innovative concepts like those developed in our group. For example, we have recently reported the first example of using chiral chromatography to determine the stereochemistry of a single enantiomer analyte (*Organic Letters*, **2014**, 16, 1402–1405). MIPs are not required for this method, but do provide a straightforward method of obtaining enantiomeric stationary phases.

Another innovative type of MIPs recently reported by our group are aptamer-based hydrogels with specific response to target protein and virus biomarkers (Scheme 2. *Journal of the American Chemical Society*, **2013**, 135, 6977–6984. Scheme 3. *Angewandte Chemie International Edition*, **2014**, 53, 2095–2098). A remarkable aspect of these super-aptamer hydrogels is that volume shrinking is visible to the naked eye down to femtomolar concentrations of protein. This extraordinary macromolecular amplification is attributed to a complex interplay



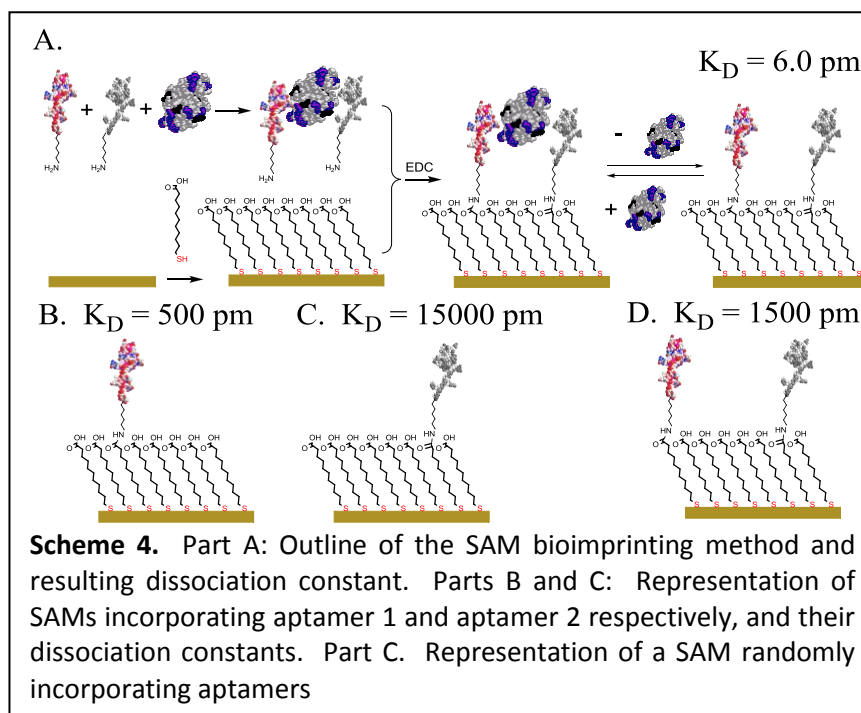
between protein-aptamer supramolecular crosslinks and the consequential reduction of excluded volume in the hydrogel. Specific recognition is even maintained in biological matrices such as urine and tears. To increase accuracy of naked-eye evaluation of the shrinking response, we have also developed diffraction grating imprinted hydrogels that have also been bioimprinted with a virus. Changes in diffraction distances of transmitted laser light gives a sensitive measure of the virus binding.

Bioimprinted films using aptamer-based SAMs are being developed in our group for surface Plasmon resonance (SPR), and even more important localized surface Plasmon resonance (LSPR), analysis of low concentrations of target biomarkers (Schemes 4 and 5). Initial efforts focused on forming and optimizing aptamer-based SAM films (Langmuir, 2006, 22, 6446-6453) and gold nanoparticles and nanorods (J. Molec.

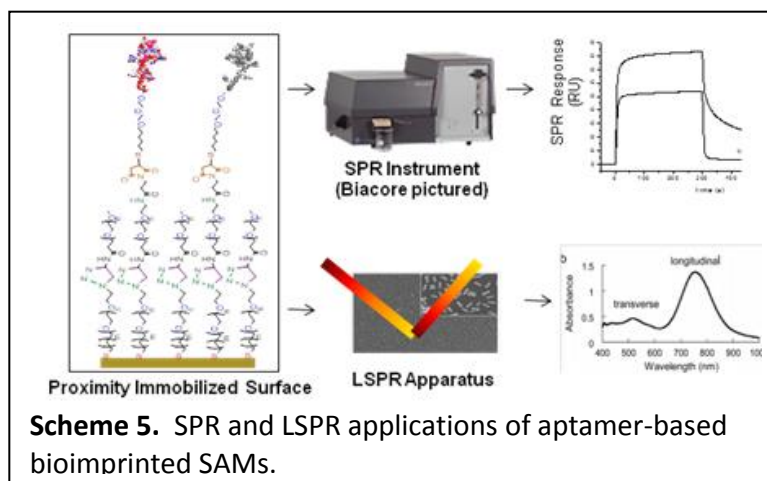
Recog., 2013, 26, 402-407) have been very successful.

With respect to more traditional MIP strategies, our group was the first to rigorously show that shape selectivity is an important component of molecular recognition in MIPs. Through a series of papers we showed that shape selectivity is most effective when there is 1 non-covalent interaction of the template with the MIP, and subordinate to functional group

pre-organization for MIPs with 3 or more non-covalent interactions (1. Anal. Chim. Acta, 2004, 504, 23-30. 2. Anal Chim Acta, 2007, 591, 7-16). In another “discovery-based” MIP materials project, the use of just one monomer (Scheme 1) for MIPs, referred to as OMNiMIPs (for one monomer molecularly imprinted polymers) has revolutionized the field because it has solved many problems of copolymer formulations and is significantly easier to carry out in practice (J. Am. Chem. Soc. 2004, 126, 7827-7833). We have an ongoing effort toward design and synthesis



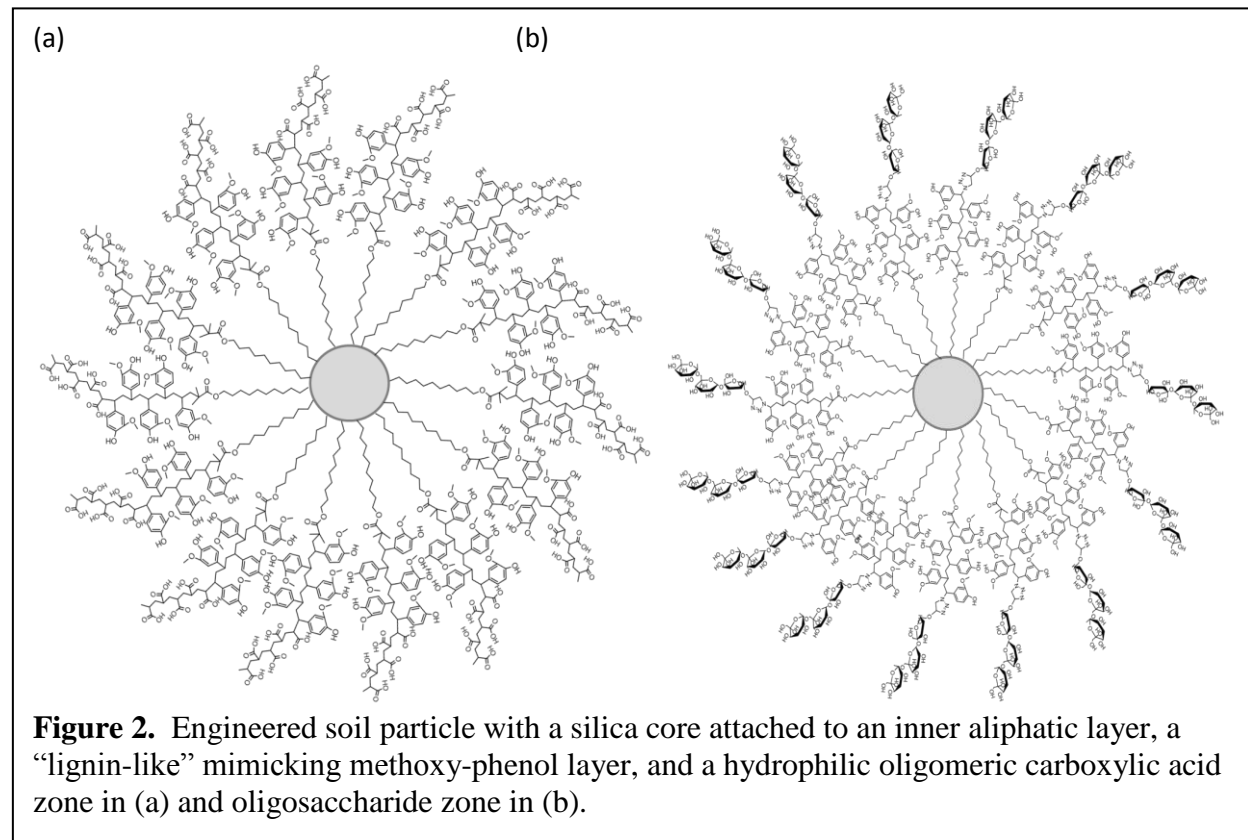
Scheme 4. Part A: Outline of the SAM bioimprinting method and resulting dissociation constant. Parts B and C: Representation of SAMs incorporating aptamer 1 and aptamer 2 respectively, and their dissociation constants. Part C. Representation of a SAM randomly incorporating aptamers



Scheme 5. SPR and LSPR applications of aptamer-based bioimprinted SAMs.

of new crosslinkers that can improve the OMNiMIP method (*Anal. Bioanal. Chem.*, **2007**, 389, 433-440).

A very different project in our group is the design and synthesis of engineered soil surrogates, in collaboration with the Cook group at LSU. The ultimate goal for the design of engineered soil surrogates is to mimic the 3-tiered hierarchy of general soil architecture that



includes an aliphatic “lipid-like” layer, a “lignin-like” aromatic layer, and a polar layer mimicking water-interactive cellulosic and carboxylate zones, as shown in Figure 2. The choice of the aliphatic inner zone is based on recent studies by us and others, which show predominantly aliphatic moieties are sorbed to clay surfaces from humic solutions. The choice of aromatic moieties within the middle zone and carbohydrate moieties in the outer phase are based on our recent studies of sequential extractions and advanced NMR analysis of isolates and soils. The synthesis of the engineered soil particles is modular, allowing substitution of different chemistries in each zone for evaluation and comparison to real-world soils. For example, replacing the oligomeric carboxylic acid group for an oligosaccharide group may provide better soil pH while maintaining hydrophilicity.

Research Collaborators at Louisiana State University:

Visiting Sabbatical Professors:

Professor Reddithota J. Krupadam, Ph.D.; 2010; National Environmental Engineering Research institute Nagpur, India

Postdoctoral Fellows:

Balamurugan Subramanian: 2003 – 2012; currently post-doctoral at LSU

Izabela Lomnicka: 2002 – 2003; currently employed at the LSU Veterinary School

Challa Kumar: 2000 - 2001; currently employed at the Center for Advanced Microstructures and Devices (CAMD), Baton Rouge, LA.

Ph.D. Students:

Martha Sibrian-Vazquez: 1998-2003; Ph.D. Thesis: Design, synthesis, and applications of bio-derived crosslinking monomers for molecular imprinting.

Hyunjung Kim: 1998-2004; Ph.D. Thesis: New insights into the binding site formation and the performance of molecularly imprinted polymers.

Ryan Simon: 1999-2005; Ph.D. Thesis: Molecular recognition and its underlying mechanisms in molecularly imprinted polymers

Jason LeJeune: 2005-2010; Ph.D. Thesis: Design and development of chiral and achiral molecularly imprinted stationary phases

Nicholas Gariano: 2006-2013; Ph.D. Thesis: Super-aptamer bioimprinted hydrogels: an investigation into the optimization and characterization of cross-linked polymeric materials displaying macromolecular amplified responses.

Wei Bai: 2008-2014; Ph.D. Thesis: Bio-Imprinted Hydro-Gels (BIGs) for protein and virus detection

Danielle Meador: 2009-2014; Ph.D. Thesis: Design, synthesis, and exploration of a chimeric antioxidant and new crosslinkers for molecular imprinting

M.S. Students:

Andrea Dupre: 2000-2003, M.S. "The Role of Silanes in Coupling Reactions and in Deoxygenative Alkylations." Currently a Professor of Chemistry at the University of Louisiana in Lafayette.

Temeeka Kennedy: 2001-2002, M.S. Currently employed at BASF Chemicals, Geismar, LA.

Mrunal Thatte: 1998-2001, M.S. "Palladium-Catalyzed Cross-Coupling of Arenediazonium Tetrafluoroborate Salts with Aryl Silanes." Ph.D. at LSU under Dr. William Daly.

Undergraduate Students:

Mark DiTusa: 2013-2014; current LSU student

Clement Janin: 2012-2013; French exchange student

Elizabeth Lissy: 2009-2011; Chemistry Honor's Research Thesis

Catherine Nguyen: 2009, Summer REU student

Andrew Meng: 2005-2008; High School Student at Louisiana Laboratory School

Yonatan Platt: 2009 LSU chemistry Major

Jimena Baron: 2009, LSU chemistry major

Mike DeLee: 2007-2008, LSU chemistry major

Dan Lazarro: 2006, LSU chemistry major

Amery Martinat: 2005 Chancellor's Future Leaders in Science Fellow

Justin Poag: 2004, Summer REU student

Ashley Smith: 2002, Chancellor's Future Leaders in Science Fellow

Katie Penny: 2001 -2002, Chancellor's Future Leaders in Science Fellow

Melissa Bueche: Spring 2002 - Spring 2003,

Natoyha Henry: Summer 2002, HHMI Undergraduate Research Fellow from University of Alabama

Scott Iacono: Summer 2000 - Fall 2000

Branko Mitasev: Summer 1999, HHMI Undergraduate Research Fellow from University of Virginia

Benjamin Caire: Fall 2001 - Spring 2002

Sherry Castle: Summer 1999

Neal Holm: Summer 1999, Currently in Medical School at Louisiana State University, Shreveport

Darci Rushing: Summer 1998, REU Undergraduate Fellow from Troy State University

Teaching Summary

Educational Awards

At the national level, I was honored in 2001 with Research Corporation's Cottrell-Scholar Award, given to only 17 out of 104 applicants. The proposal integrates research involving polymerizable nanostructured assemblies with nanoscience educational goals, and the award emphasis is on the educational efforts versus research products. At the local level, I have also received Louisiana State University's Tiger Athletic Foundation Undergraduate Teaching Award in 2001, given to only two professors in the Basic Sciences Department each year. This award reflects the positive feedback from all my efforts in undergraduate education, evaluated by the students and compiled by LSU each semester. However, more gratifying is some of the "Educational Rewards" I have received from students, such as this comment from Brian O'Shea, a student in my first year organic chemistry course (CHEM 2262) who said: "I learned more in your class than any other.... Thank you for being a great Mentor." Another of my favorite reviews came from the undergraduate student in the "Nanoscience" course, Rae-Lynn Poitier, who said "...[this is] the first time I can say I really enjoyed myself and learned something at the same time... Thanks Dr. Spivak - you made it all happen.... I can't think of a better course to finish out my "career" at LSU."

Courses Taught and Evaluations

LSU has three categories of courses: undergraduate level (1000-3000), graduate level (7000-9000), and an intermediate level targeted at advanced undergraduates and beginning graduate students (4000). At the undergraduate level I have taught the first year of Organic Chemistry comprised of two semesters (CHEM 2261 and CHEM 2262), taught the second semester of the honors level Organic Chemistry (CHEM 2462). These are generally some of the largest classes on campus, and have garnered a reputation as difficult courses on any campus; therefore, teaching these courses is challenge. To make the students more comfortable I teach with enthusiasm and humor, and let them know we are all on the same team with the primary goal of their success. This approach, and with the use of an innovative "Map of Organic Chemistry" (vide infra) I have had great success at teaching thousands of students exemplified by student evaluation averages close to, or often better, than averages of the Chemistry Department and the College of Science (Figure 3).

I have taught two different intermediate level courses: CHEM 4563, Spectroscopic Identification of Organic Compounds; and CHEM 4564 Advanced Organic and Inorganic Synthesis Laboratory. In the absence of any other available faculty to teach the advanced Spectroscopy course, I volunteered to make sure our graduate students had this important course available. The first innovation I brought to the course was a new textbook, and a new array of projects and assignments for fresh presentation of the subject. The students were great to work with, and many have stated that of all the classes they have taken at LSU in graduate school, CHEM 4563 was the most helpful for their Ph.D. programs. Student evaluations were within a standard deviation of average, which is a good start for developing a course anew. The first course I taught at LSU was CHEM 4564, which was important for me to establish my ability to teach and handle course development. I renovated the course into a much more organized program that fulfilled the requirements for ACS accreditation for our undergraduate chemistry

majors. The course was very well-received by the students who frequently gave evaluation averages above the department and college.

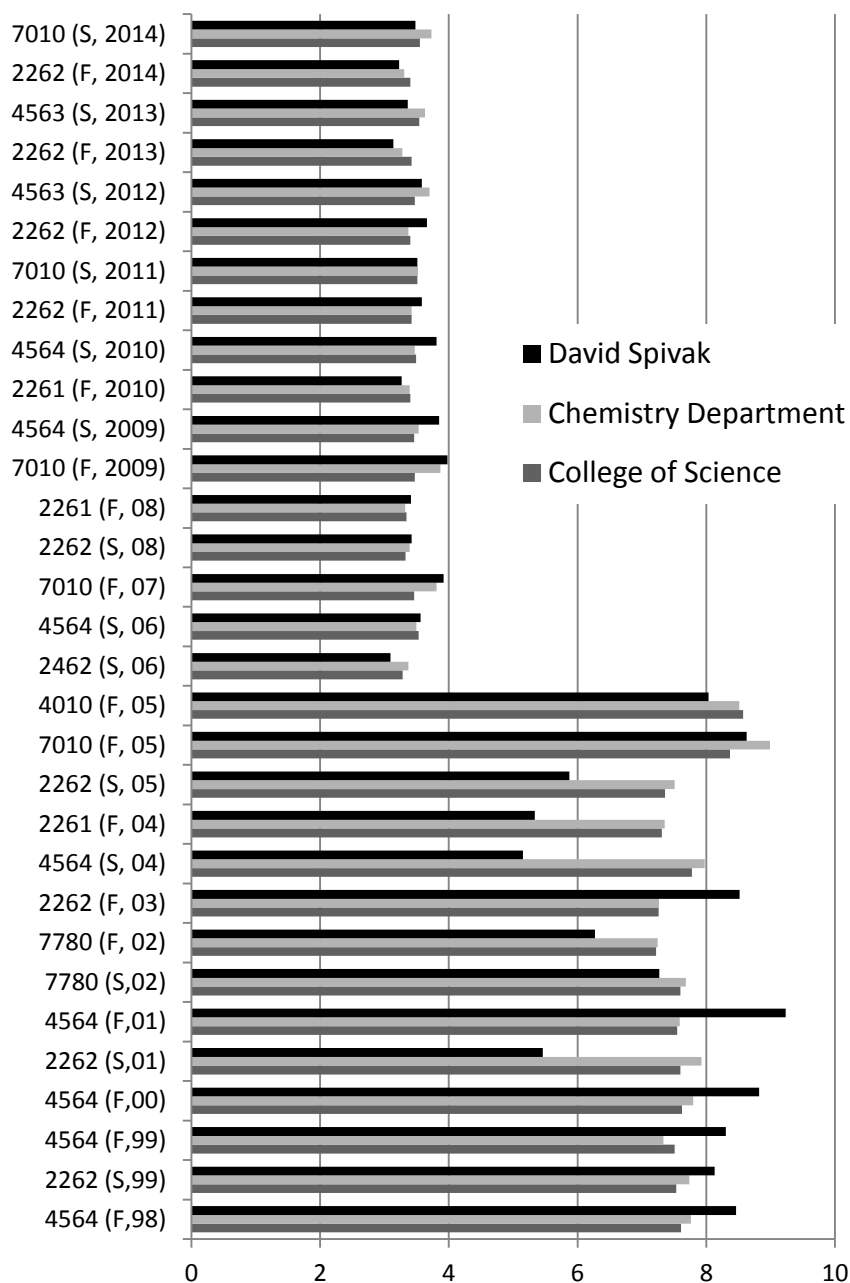


Figure 3. Average values of all questions evaluated for each course for each semester, with comparison of David Spivak versus the Chemistry Department and College of Science averages. Averages in the interval 1998-2005 are measured on a 10-point scale; averages in the 2006-2014 interval are on a 4-point scale. Y-scale labels: Chemistry course number (Fall (F) or Spring (S), year of course).

At the graduate level, I teach a biennial course “Macromolecular Studies III: Polymer Synthesis” (CHEM 7010, but taught initially as CHEM 7780). This is the only graduate level polymer course that is taught regularly in the Chemistry Department, and is instrumental for polymer graduate students to complete their three courses of the core polymer curriculum at LSU. A major challenge in teaching this course is addressing the needs of students with different polymer education backgrounds; some students do not have any formal training in the field, and others have had extensive training from schools that have polymer science departments. Thus, the difficulty level of the course is adjusted to match the academic demographics of the class in such a way as to provide a valuable learning experience for everyone. Another special topics course (7780) developed early in my career was "An Interdisciplinary Introduction to Nanoscience." Most nanoscience courses focus on engineering, but a novel approach was taken to cover supramolecular chemistry, biology, and micro/nanofabrication.

Course Development

With the philosophy that faculty-student interaction facilitates learning, very successful lecture/laboratory courses in polymer/macromolecular science have been developed by my colleagues and I at LSU. Three new courses have been introduced starting in the year 2000 as the core lesson plan of the macromolecular division of the chemistry department. Introductory courses, “Macromolecular Studies I and II” (CHEM 4010-4011) are first year courses for graduate students and senior undergraduate students. These courses are team taught including lectures from me, other colleagues from Chemistry, Chemical Engineering, and Biology department faculty. There is also an advanced graduate polymer course entitled “Macromolecular Studies III: Polymer Synthesis” (CHEM 7010) which I originally initiated and developed the curriculum. I continue to teach this course every other year, covering topics such as the fundamentals of advanced polymer synthesis; kinetics; structure-property relationships; and polymerization mechanisms, catalysts, and initiators.

In Spring of 2002, I developed a cutting-edge special topics course for LSU targeting graduate students: "An Interdisciplinary Introduction to Nanoscience." Nanoscience lecture and laboratory courses provided a highly interdisciplinary environment involving graduate students, undergraduate students, and faculty from Chemistry, Biology, Engineering departments. One of the most important and rewarding achievements of teaching this course was to involve students and foster research collaborations between the Chemistry department and other departments, as well as LSU's Center for Advanced Microstructures and Devices (CAMD). Furthermore, the brave undergraduate student who took this course successfully obtained an "A", demonstrating propriety of the class for more undergraduate students.

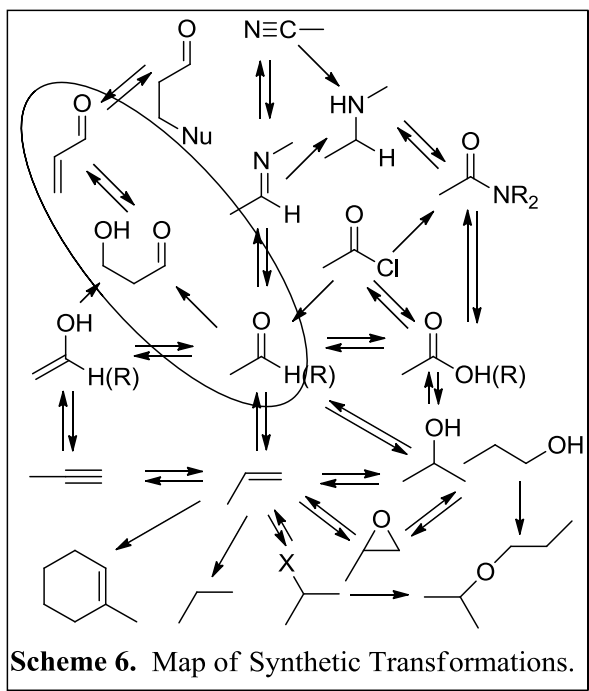
Other Educational Developments

In addition to the previous courses, I have taught the large first year course in “Organic Chemistry” (CHEM 2262), and the “Advanced Synthesis Laboratory” (CHEM 4564) for senior undergraduates. To handle the large first year “Organic Chemistry” class, I was available for office hours at any time, conducted extra-curricular review sessions before every exam, and over the last decade I have been developing a method to teach multi-step synthesis to first-year undergraduate organic chemistry students. Multi-step synthesis is one of the most difficult subjects to teach students, and is essentially the opus of sophomore year organic chemistry

courses. Although students have been taught retrosynthetic analysis and numerous reactions, very few are able to string synthetic transformations together in a meaningful synthesis. What they need is a "map" to guide them from one synthetic destination to the other, such as the synthetic transformation map shown in scheme 6. The circled portion of scheme 6 shows the pathway to get an α,β -unsaturated carbonyl compound given an aldehyde or ketone. Students who have graduated from my class constantly return and tell me that the maps are one of the best tools they've ever received for learning organic chemistry.

Future Educational Goals

The novel teaching methods for organic chemistry presented above will be expanded into a book and full course in teaching organic chemistry using the map as a guide. This increased level of organization will facilitate understanding and learning in this difficult course, and move toward conquering problems have with molecular synthesis. Because of my interest in interdisciplinary studies for students, I would like to continue developing curriculum for interfacing organic chemistry, bioanalytical chemistry, nanoscience, and macromolecular/materials programs. To aid this goal, the macromolecular chemistry efforts at LSU are highly interdisciplinary subjects that provide a general venue for multi-disciplinary training and development of graduate level special topics courses. This also serves as a focal point for the chemistry department/group to interact with other departments, centers, and institutions.



Scheme 6. Map of Synthetic Transformations.

Appendices


Appendix item 1: Letter of commendation for Teaching Excellence from Dean of the College of Science.



College of Basic Sciences

Date: February 9, 2010

To: Professor David Spivak
Department of Chemistry

From: Kevin Carman, Dean
College of Basic Sciences 

Cc: Andrew Maverick, Chair
Department of Chemistry

Re: Commendation for Excellence in Teaching

Packing, moving, and unpacking as we moved the College offices from Choppin to Hatcher delayed our annual process of examining teaching evaluations from the past year. As always, Basic Sciences faculty are outstanding teachers. Within this context, it gives me particular pleasure to recognize a few individual faculty members who have truly distinguished themselves in the classroom.

Faculty have complex and demanding jobs, including teaching at the undergraduate and graduate levels, research and publication, and departmental, college, and professional service. The teaching function alone puts very diverse demands on faculty, ranging from large service courses to more intimate advanced undergraduate and graduate courses to the one-on-one instruction in our laboratories. While professional reputations may not be built primarily on teaching, instruction is a major part of our mission as a university. While we take great satisfaction in our research, it is likely that our true legacy will be defined by the students that we have inspired. It is therefore a privilege for me to recognize superior performance in the classroom, and to applaud you for the excellent teaching evaluations in that you received in CHEM 4564 for Spring 2009.

Congratulations on excellent teaching as perceived by the students and indicated in these evaluations. We are proud of your accomplishments and wish you continued success in your instructional efforts.

Office of the Dean, College of Basic Sciences • 336 Hatcher Hall • Baton Rouge, Louisiana • 70803
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by T. Mairal, V.C. Oezalp, P.L. Sanchez, M. Mir, I. Katakis,
C.K. O'Sullivan ► Anal Bioanal Chem (2008) 390:989–1007

SERS: a versatile tool in chemical and biochemical diagnostics
by K. Hering, D. Cialla, K. Ackermann, T. Doerfer, R. Moeller,
H. Schneidewind, R. Mattheis, W. Fritzsche, P. Roesch, J. Popp
► Anal Bioanal Chem (2008) 390:113–124

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390:89–111

**Multiresidue methods for the analysis of pharmaceuticals,
personal care products and illicit drugs in surface water and
wastewater by solid-phase extraction and ultra performance
liquid chromatography-electrospray tandem mass spectrom-
etry** by B. Kasprzyk-Hordern, R.M. Dinsdale, A.J. Guwy
► Anal Bioanal Chem (2008) 391:1293–1308

**Variation in the isotopic composition of zinc in the natural
environment and the use of zinc isotopes in biogeosciences:
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► Anal Bioanal Chem (2008) 390:451–463

Elemental mass spectrometry for quantitative proteomics
by A. Sanz-Medel, M. Montes-Bayon, M.R. Fernandez de la
Campa, J. Ruiz Encinar, J. Bettmer ► Anal Bioanal Chem (2008)
390:3–16

**Analysis of cocaine and its principal metabolites in waste and
surface water using solid-phase extraction and liquid
chromatography-ion trap tandem mass spectrometry**
by A. Gheorghe, A. van Nuijs, B. Pecceu, L. Bervoets, P.G. Jorens,
R. Blust, H. Neels, A. Covaci ► Anal Bioanal Chem (2008)
391:1309–1319

**Surface immobilization methods for aptamer diagnostic
applications** by S. Balamurugan, A. Obubuafo, S.A. Soper,
D.A. Spivak ► Anal Bioanal Chem (2008) 390:1009–1021

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In their review, Subramanian Balamurugan and David A. Spivak, Louisiana State University, Baton Rouge, LA, USA, focus on molecular imprinting in monolayers, where a template is employed to specifically order single molecules or macromolecules on a surface. Besides this there exist other important surface imprinting methods such as bulk-polymer thin film coatings on surfaces, inorganic surface imprinting, polymer grafting, and layer-by-layer polymer coatings.

Due to difficulties in imprinting large molecules and obtaining fast binding responses with traditional network polymer materials, Molecularly Imprinted Monolayers (MIMs) have been developed with the aim of enhancing mass-transfer of analytes in imprinted materials.

Three approaches to MIM fabrication have been developed with respect to the formation of the pre-organized template matrix complex. In the first approach (picture: A), the molecular binding sites are formed in a monolayer on a glass or gold surface by first adsorbing the template molecule on the substrate and the monolayer of functionalized alkane is formed around it. The second approach (B) uses a template-macromolecule complex to form binding sites in the solution phase that are immobilized onto a surface. The third approach transfers an imprinted Langmuir film onto a gold surface. Mass transfer in these MIMs in most cases is in the order of minutes, and both small and large molecules (proteins) have been imprinted.

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The use of MIMs is a promising approach for molecular recognition and molecular sensing with advantages over more traditional molecular imprinting techniques.

Molecular imprinting in monolayer surfaces,
Subramanian Balamurugan, David A. Spivak,
J. Mol. Recognit. **2011**, *24*, 915–929.
DOI: 10.1002/jmr.1150

Article Views: 1461

24

Appendix item 4. Appreciation letter for serving as judge for the Louisiana Science and Engineering Fair



CONTINUING EDUCATION
Louisiana Science and Engineering Fair • 1225 Pleasant Hall • Baton Rouge, LA 70803-1520 • O 225-578-6325 • F 225-578-6324 • www.outreach.lsu.edu/lsef

April 30, 2009

David Spivak
LSU Chemistry
735 Choppin Hall
Baton Rouge LA 70803

Dear David Spivak :

Thank you for serving as a judge at the Louisiana Science and Engineering Fair on April 20, 2009. We believe this year's State Fair was one of the best with 656 students in the 6th -12th grades from 166 public, private, charter and home schools located across Louisiana.

To the students you judged, talking with you was a memorable learning experience. Being taken seriously for their scientific ideas was a positive challenge few are likely to ever forget.

Many teachers shared how pleased their students were with this year's fair because the judges asked so many great questions about their projects and were encouraging.

Thank you for taking the time to inspire and challenge these students. We know that you and the other judges had a positive impact on their lives and we commend you for generously sharing your time.

The winners of the Louisiana Science and Engineering Fair can be found by going to the Continuing Education website at www.outreach.lsu.edu then selecting Louisiana Science and Engineering Fair. Students who win at the International Science and Engineering Fair scheduled May 10-15, 2009 in Reno, Nevada will be posted on the above website by May 25, 2009.

Again, thank you for serving as a Louisiana Science and Engineering Fair judge. We hope you will join us again next year.

Sincerely,

Gail Hawkes

Appendix item 5. Materials for German-American Frontiers in Science Symposium



NATIONAL ACADEMY OF SCIENCES

THE NATIONAL ACADEMIES

ARNOLD AND MABEL BECKMAN
FRONTIERS OF SCIENCE SYMPOSIA

May 20, 2003

Dear Symposium Participant:

I am pleased that you plan to attend the 9th Annual German-American Beckman Frontiers of Science Symposium, sponsored by the U.S. National Academy of Sciences and the Alexander Von Humboldt Foundation. As you know, this year's symposium will be held June 5-7 at the Arnold and Mabel Beckman Center of the National Academies of Science and Engineering in Irvine, California.

The enclosed notebook contains the program, schedule, and list of posters for the symposium. Please note that the order of the sessions listed on the schedule is alphabetical; the final sequence of the sessions will be sent to participants via e-mail shortly before the meeting. A complete roster of participants for the symposium and statements of research interests for all participants are included at the end of the notebook. A symposium questionnaire is enclosed as well; please take a moment during the symposium to complete the questionnaire. Your comments and suggestions will be helpful for the 2004 organizing committee in planning next year's symposium.

To help prepare you for the symposium, we have included summaries for each of the eight sessions listed in the program as well as selected review articles. While all of the session lectures are geared toward an interdisciplinary audience, we encourage you to examine these summaries and articles to better prepare you to participate actively in the discussions.

Please do not hesitate to let me or any of the symposium staff know if we can do anything to accommodate you during your stay in Irvine. I look forward to welcoming you to the symposium.

Sincerely,

A handwritten signature in black ink, appearing to read "Ken".

Kenneth R. Fulton
Executive Director

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**Ninth Annual German-American
Beckman Frontiers of Science Symposium**
Alexander von Humboldt Stiftung – U.S. National Academy of Sciences
Irvine, California - June 5-7, 2003

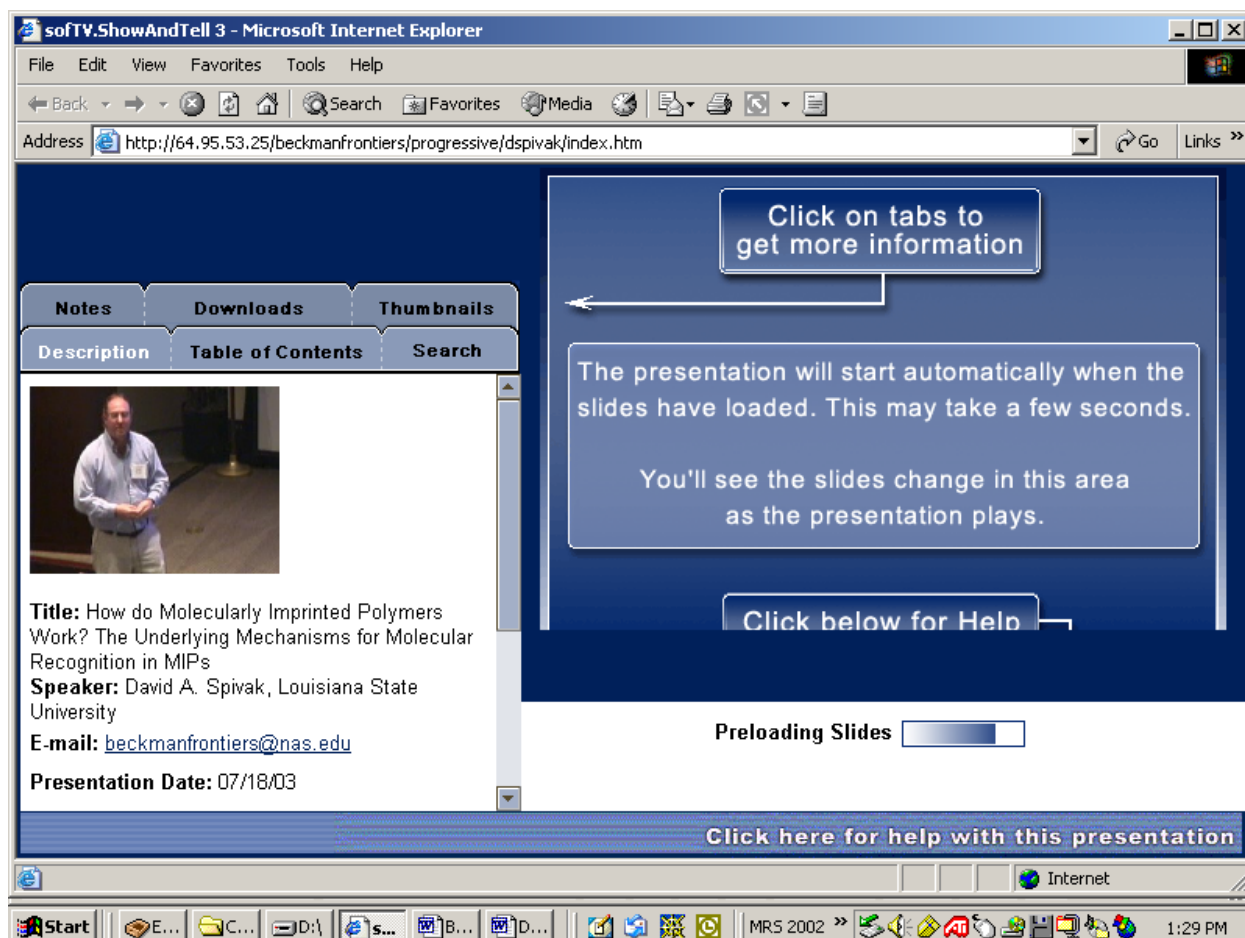
FINAL PROGRAM

Polymers with Memory
Organizers: David Patrick and Kay Severin

CHAIR:
Polymers with Memory
Borje Sellergren, Johannes Gutenberg University Mainz

SPEAKERS:
Polymers with Memory: Accelerating Reaction Rates with Imprinted Polymers
Michel R. Gagné, The University of North Carolina at Chapel Hill

How do Molecularly Imprinted Polymers Work?
The Underlying Mechanisms for Molecular Recognition in MIPs
David A. Spivak, Louisiana State University



LSU RESEARCH

FOR LSU'S FACULTY & FRIENDS

RESEARCH,
GRADUATE
STUDIES,
ECONOMIC
DEVELOPMENT



Lynn Jelinski shows an insider's view of the reception in honor of LSU's authors.

Honoring LSU Authors

Organized by Brj Mohan, Jose Montiel, and Paul Paskoff, a reception was held on May 2 to showcase part of LSU's scholarly output during the past two years. Attendees walked past the book jackets of more than 135 books and journals authored and edited by LSU faculty before entering the reception in honor of LSU's authors. The highlights of the reception was the drawing for ten \$1,000 travel/research awards. A similar event will be held next year for works of art and original musical and theater compositions. If you wish to volunteer for the next year's committee, contact Lynn Jelinski at jelinski@lsu.edu.

INSIDE THIS ISSUE

- ◆ Distinguished Research Master Awards
- ◆ Symposium Honors Graduates' Success
- ◆ William Pryor Wins Esalen Award
- ◆ Professor Receives \$5,000 ORAU Award
- ◆ Director Wins Literary Peace Prize
- ◆ Nominations for Lecturers Due
- ◆ Chancellor's Distinguished Lecture Series
- ◆ Committees in Action

Watch out Mike! Robo-tiger is Learning How to Walk

As part of their research on hierarchical adaptive systems, computer science professor and chair Ram Iyengar and his graduate student Patrick McDowell are building robot systems capable of learning and adapting to external stimuli. An example of adaptation is how humans change their walking style as they go from a smooth, paved road surface to a muddy, freshly plowed field. Although easy for a human, this is a very difficult computational problem for a robot. These robots have numerous applications, including environmental cleanup, hazardous spill response, and defense needs.

For additional information: <http://www.rri.lsu.edu/>



Above: The current incarnation of Robo-tiger. Inset: Designer and programmer, computer science graduate student Patrick McDowell.

Professor Receives \$5,000 ORAU Award

David Spivak, assistant professor of chemistry, has been selected to receive a 2000 Ralph E. Powe Junior Faculty Enhancement Award. The award is given by Oak Ridge Associated Universities (ORAU) sponsors of the Ralph E. Powe Junior Faculty Enhancement Award Program. "The peer-review evaluation and selection process is rigorous and involves outstanding scientists from across the nation," explains Ronald D. Townsend, president of ORAU. The recipients of these \$5,000 research awards which are matched by their home institutions, were competitively selected from among 75 faculty applications.



FACULTY

AWARDS


Lod Cook Alumni Center

May 8, 2001

*Tiger Athletic Foundation
Undergraduate Teaching Award*

<i>Agriculture</i>	<i>Joan King</i>
<i>Agriculture</i>	<i>Jeffrey Gillespie</i>
<i>Arts & Sciences</i>	<i>Gary Greguras</i>
<i>Arts & Sciences</i>	<i>Patrick McGee</i>
<i>Basic Sciences</i>	<i>Savitha Pinnepalli</i>
<i>Basic Sciences</i>	<i>David Spivak</i>
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<i>Design</i>	<i>Ursula Emery-McClure</i>
<i>Education</i>	<i>Helene Afeman</i>
<i>Education</i>	<i>Thomasine Mencer</i>
<i>Engineering</i>	<i>Emerald Roider</i>
<i>Engineering</i>	<i>Michael Kuhl</i>
<i>Honors</i>	<i>Jordan Kellman</i>
<i>Honors</i>	<i>Drew Lamonica</i>
<i>Mass Communication</i>	<i>Anne Cunningham</i>
<i>Mass Communication</i>	<i>Ronald Snipes</i>
<i>Music & Dramatic Arts</i>	<i>Jennifer Jones</i>
<i>Music & Dramatic Arts</i>	<i>Constance Carroll</i>
<i>University College</i>	<i>Dottie Vaughn</i>
<i>University College</i>	<i>Kam-biu Liu</i>

Appendix item 7. Certificate of ACS Ambassador for 2013 and 2014.



Certificate of Recognition

David Spivak

*is recognized as an ACS Chemistry Ambassador
for promoting the value of chemists
and chemistry to the community*

November 14, 2013


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May 22, 2014


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Chair, ACS Committee on
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Amina El-Ashmawy
Chair, Chemistry Ambassadors
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American Chemical Society www.acs.org/chemistryambassadors

Appendix item 8. International Reputation: David Spivak is one of the top American representatives for the field of molecular imprinting. In 2014, 3542 papers were published in this field under the search term “imprinted” refined for journals. This is more papers than published for polymerization using ATRP or RAFT (817 and 1643 respectively) combined, searched using the terms “ATRP” and “RAFT”. The following illustrates David Spivak’s leadership and international reputation.

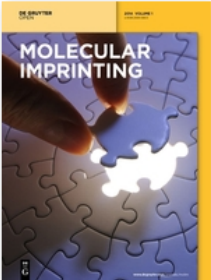
a. David Spivak has been an elected member to the board of the international Society for Molecular Imprinting (<http://mipsoc.org/SMI/board.php>) since 2006. There is only one other American on this board.



The Society for Molecular Imprinting

LOG IN REGISTER NEWS GROUPS ABOUT DATABASE FORUMS JOURNALS	
SMI News MIP paper makes the journal cover Call for papers: "Molecular Imprinting For Proteins And Related Biomolecules" MIP paper awarded Review Paper accolade for 2015 by the International Journal of Molecular Sciences MIP paper picks up Sensors best paper award 2015 Open access and Institutional repositories Special issue "Development and applications of affinity separations in life sciences" MIP papers remain HOT! National Award for Dr. Reddithota J. Krupadam MIP author honoured Changes to the SMI website	Log on mipsoc.org for free Update your profile on mipsoc.org - make it your online CV!
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SMI Jobs Test posting	
SMI Events MRS Spring Meeting 2015 Nanotech Tunisia 2015 international conference & Exhibition 4th International	



b. David Spivak has been on the editorial board of the journal of Molecular Imprinting since its inception in 2011 (<http://www.degruyter.com/view/j/molim>). He is 1 of 3 American representatives for the editorial board of this international journal.





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c. David Spivak was 1 of only 2 American representatives invited to Dalian, Japan for the DICP sponsored International Forum on Molecular Imprinting. DICP is the Dalian Institute for Chemical Physics, the Chinese Academy of Sciences.



d. David Spivak is only American representative on the editorial board of the Journal of Molecular Recognition, elected for his expertise in Molecular Imprinting and aptamers.

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e. David Spivak was elected chair of the only International Molecular Imprinting Symposium held in America (<http://macro.lsu.edu/msgsa/MIP2010/MIPHomepage.html>).



MIP2010: The 6th International Conference on Molecular Imprinting

More Information at: <http://macro.lsu.edu/msgsa/MIP2010/>

Come and join us in New Orleans, Louisiana for the 6th International Conference on Molecular Imprinting! The conference will be held from August 9-12, 2010 at one of the finest hotels in the heart of the French Quarter, the Royal Sonesta Hotel. MIP2010 will highlight recent research activities in Molecular Imprinting and related fields. A gala dinner will be held on a Mississippi paddle wheel boat adventure, and there will be a tour of the Louisiana wetlands (beware of alligators!).



Register Now!*

Registration Fees and Due Dates:

Early Registration (Until May 14, 2010)	\$575
Students (Until May 14, 2010)	\$150
Late Registration (May 14 – July 24, 2010)	\$700
Students (May 14 – July 24, 2010)	\$200
Riverboat Gala Dinner	\$64



* Payments automatically requested after online registration.



Abstract Deadline: May 14, 2010

Please submit your abstract online at the website above before the due date, late submissions will not be accepted.

For any further information or travel assistance, please contact the Program Chairs at:

David Spivak: dspivak@lsu.edu or Kenneth J. Shea at kjshea@uci.edu

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