

Teaching Experience:

| | |
|--|-----------|
| <u>University of Massachusetts, Amherst</u> | 2002-2006 |
| <i>Undergraduate:</i> Honors Gen. Chem. – lecture (Fall 2002); Int. Inorg. Chem. – lab (Spring 2003, 2004); Int. Descriptive Inorg. Chem. – lecture (Spring 2006, 2007, 2008) | |
| <i>Graduate:</i> EPR as a Research Technique – Journal Club (Spring 2004); Reaction Mechanisms – Journal Club; Coordination Chem. – lecture (Fall 2004, 2005); Metals in Biology (Fall 2006); Bioinorganic chemistry- journal club (Fall 2007) | |
| <u>University of California, San Diego</u> | 1993-1994 |
| Gen. Chem. – Led recitation and laboratory sections. | |
| <u>San Diego Unified School District</u> | 1989-1992 |
| Assistant to secondary-school science department; and led student labs | |

Awards and Memberships:

- NIH Postdoctoral Fellowship
- NIH Predoctoral Trainee
- Member, American Association for the Advancement of Science
- Member, American Chemical Society
 - Division of Inorganic Chemistry
 - Division of Biological Chemistry

Reviewer for

Funding Agencies: NSF, ACS-PRF, Burroughs Wellcome Fund

Journals: Inorg. Chem., Biochemistry, Trends in Biotech., PNAS, J. Am. Chem. Soc.,

Research Capsule Data

Research Area – Molecular Mechanisms of Hypoxia Sensing

Recombinant expression and purification of HIF-asparaginyl hydroxylase protein.
Kinetic mechanism of HIF hydroxylases. Protein dynamics.

Research Area – Charge transfer in protein-nanoparticle hybrid materials

Kinetics of interprotein electron-transfer; protein-nanoparticle recognition; inhibition by colloidal nanoparticles, bio-nanotechnology.

Research Area – Fluorescence sensing

Developing small molecules for detection of explosives and environmental contaminants.
Inorganic synthesis and immobilization strategies for molecules on porous solids; lifetime and steady-state fluorescence measurements.

Research Group Summary

Graduate students (all Ph.D. track)

- Mr. Yuan-Han (Robert) Chen, June 2003 – present, Hypoxia sensing
- Ms. Meaghan Germain, February 2004 – present, fluorescence sensing
- Ms. Adrienne Gilbert-Carver, February 2004 – present, nano-protein hybrids
- Mr. Halil Bayraktar, February 2004 – present, Protein-nanomaterials
- Ms. Shannon Coates, February 2006 – present, Hypoxia sensing

Mr. Evren Saban, February 2006 – present, Hypoxia sensing

Sponsored Research

Active

1R01-GM077413 Knapp (PI) Apr. 1, 2007 – Mar. 1, 2012
National Institutes of Health
“Molecular Mechanisms of Hypoxia Sensing by the HIF-hydroxylases,”
\$1.1 M (total) 5-years
\$ 722,000 (direct) 5-years
\$190,000 direct (year 1)

Completed

PRF40033-G4 Knapp (PI) 9/1/03-8/31/05
American Chemical Society – Petroleum Research Fund
Quantum Effects in Catalysis: H-Atom Transfer in C-H Oxidation
Explores the relevance of tunneling as an alternative catalytic strategy in enzymatic C-H
oxidation chemistry. Relies upon comparing catalysis by synthetic models with enzymatic
catalysis.
\$35,000 total

IRG 93-033 3/1/05 – 2/28/06
American Cancer Society – Individual Allocation from Institutional Research Grant
“Protein Conformation Changes in Hypoxia Sensing”
The goal of this study is to develop biophysical and kinetic studies of FIH. This is a ‘seed’ grant.
\$20,000 (total)

FRG/Healy Endowment(internal) Knapp (PI) 6/1/05 – 5/31/06
University of Massachusetts, Amherst
Inhibiting Protein-Protein Recognition with Nanomaterials.
The goal of this study is to develop high-throughput screening assay for inhibitors of protein-
protein recognition.
\$30,000 (total)
PI of this grant.

FRG (internal) Knapp (PI) 11/01/03-4/1/04
University of Massachusetts, Amherst
Enzymology of Oxygen-Dependent Gene Regulation
This grant provided seed money to develop heterologous expression of HIF hydroxylases.
\$12,000 total
PI of this grant.

Publications

Independent Career:

- (29) Carver, A. C.; Knapp, * M. J.; "Electron and energy transfer reactions of Ru(bpy)₃^{2+*/3+} with copper-phenolates," *submitted, Polyhedron*
- (28) Chen, Y.; Saban, E.; Knapp, * M. J.; "Equilibrium unfolding of the HIF-asparaginyl hydroxylase, a human hypoxia sensor," *submitted, Biochemistry*
- (27) Germain, M. E.; Knapp, * M. J. "Discrimination of nitroaromatics and explosives mimics by a fluorescent Zn(salicylaldimine) sensor array," *accepted, J. Am. Chem. Soc.*
- (26) Germain, M. E.; Vargo, T. R.; Odoi, M.; Knapp, * M. J. "'Quenching mechanism of Zn(salicylaldimine) by nitroaromatics," *submitted, Inorg. Chem.*
- (25) Bayraktar, H, Srivastava, S.; You, C.-C.; Rotello, * V. M.; Knapp, * M. J. "Controlled nanoparticle assembly through protein conformational changes," *Soft Matter* **2008** *4*, 751-756 (cover article)
- (24) Bayraktar, H.; You, C.-C.; Rotello, * V. M.; Knapp, * M. J. "Facial Control of Nanoparticle Binding to Cytochrome c," *J. Am. Chem. Soc.* **2007**, *129*, 2732-2733.
- (23) Germain, M. E.; Vargo, T. R.; Khalifah, P. G.; Knapp, * M. J. "Fluorescent detection of nitroaromatics and 2,3-dimethyl 2,3-dinitrobutane (DMNB) by a zinc complex: (L)Zn," *Inorg. Chem.* **2007**, *46*, 4422-4429.
- (22) Sandanaraj, B. S.; Bayraktar, H.; Krishnamoorthy, K.; Knapp, * M. J.; Thayumanavan, * S. "Amphiphilic Homopolymer Assemblies for Recognition and Modulation of Electroactive Biomacromolecules," *Langmuir* **2007**, *23*, 3891-3897.
- (21) You, C.-C.; Agasti, S. S.; De, M.; Knapp, M. J.; Rotello, * V. M.; "Modulation of the Catalytic Behavior of α -Chymotrypsin at Monolayer-Protected Nanoparticle Surfaces," *J. Am. Chem. Soc.*, **2006**, *128*(45), 14612-14618.
- (20) Bayraktar, H.; Ghosh, P. S.; Rotello, * V. M.; Knapp, * M. J. "Disruption of protein-protein interactions using nanoparticles: inhibition of cytochrome c peroxidase," *Chem. Comm.* **2006**, 1390-1392.
-

Postdoctoral and Predoctoral Training:

- (19) Knapp, M. J.; Meyer, M. M.; Klinman, J. P. In *Handbook of Hydrogen Transfer, Vol; 2: Biological Aspects of Hydrogen Transfer*; Schowen, R. L., Klinman, J. P., Eds.; Wiley VCH: Weinheim, **2006**.

Manuscripts in Preparation:

Robert Chen, Stephen J. Eyles, Michael J. Knapp, "Self-Hydroxylation of the HIF-Asparagine Hydroxylase, HND" *in prep.*

Robert Chen, Lindsay Comeaux, David Kennedy, Evren Saban, Michael J. Maroney, Michael J. Knapp; “Coordination changes lead to inactivation of HND: oxidation and self-hydroxylation in a human hypoxia sensor.” *Manuscript in prep.*

Halil Bayraktar, Nicole Moorner, Partha Ghosh, Adrienne Carver, Vince Rotello, Michael Knapp; “Tuning substrate selectivity in cytochrome c peroxidase through surface recognition by gold nanoparticles.” *Manuscript in prep.*

Presentations (since appointment to UMass, Sept. 2002)

Professional Meetings:

Knapp, M. J.; “Controlling oxidative chemistry in nanoparticle/enzyme hybrids: tuning substrate selectivity through surface effects,” Metals in Biology Gordon Conference, Jan 27 – Feb 1, 2008. Poster

Knapp, M.J. “Controlling electron-transfer at inter-protein recognition interfaces,” 2007 NSF Inorganic Chemistry Workshop, Jackson Hole WY, June 4-7 2007. Invited talk

Halil Bayraktar, Sudhanshu Srivastava, Chang-Cheng You, Vincent M. Rotello, and Michael J. Knapp. “Reversible formation of nanoparticle-cyt c assemblies through conformational changes,” 234th National ACS Meeting, Boston MA, Aug 19-23, 2007; INOR 427. Talk

Michael J. Knapp, “Cofactor binding and spectroscopy in the HIF-asparaginyl hydroxylase, FIH-1,” 234th National ACS Meeting, Boston MA, Aug 19-23, 2007; INOR 30. Talk

Meaghan E. Germain and Michael J. Knapp, “Photoinduced electron transfer of Zn(salophen) and fluorescence sensing applications,” 234th National ACS Meeting, Boston MA, Aug 19-23, 2007; INOR 488. Talk

Michael J. Knapp, “Fluorescent detection of explosives analogs by Zn(II) coordination compounds,” 233rd National ACS Meeting, Chicago IL, Mar 25-29, 2007; INOR 1207. Talk

Michael J. Knapp, “Electron transfers in protein/nanoparticle hybrids,” 233rd National ACS Meeting, Chicago IL, Mar 25-29, 2007; INOR 1224. Talk

Knapp, M. J.; “Electron transfers to Cytochrome c at nanoparticle surfaces,” Metals in Biology Gordon Conference, Jan 28 - Feb 2, 2007. Poster

Michael J. Knapp; “Controlling heme proteins with nanoparticles,” 232nd ACS National Meeting, San Francisco, CA, September 10-14, 2006; INOR 617. Talk

Chen, R.; Eyles, S.; **Knapp, M.J.** “Structure and dynamics of the HIF-asparaginyl hydroxylase,” Metals in Biology Gordon Conference, Jan 2005. Poster

Invited Seminars

Dartmouth College, Department of Chemistry, Feb. 7, 2008

Ohio State University, Department of Chemistry, Jan 10, 2008

Notre Dame, Department of Chemistry, Dec. 14, 2007

SUNY Oneonta, Chemistry, Nov. 26, 2007

Rensselaer Polytechnic Institute, Center for Biotechnology, Nov. 27, 2007

University of Nevada, Reno, Department of Chemistry, Dec. 7, 2007

University of Michigan, Department of Chemistry, Nov. 5, 2007

Michigan State University, Department of Chemistry, Nov. 2, 2007

Wayne State University, Department of Chemistry, Nov. 1, 2007

Syracuse University, Chemistry Department, Oct. 9, 2007

Hamilton College, Chemistry Department, Oct 8, 2007

University of Kentucky, Chemistry Department, Oct. 5, 2007

University of Cincinnati, Chemistry Department, Oct. 4, 2007

University of Connecticut, Chemistry Department, Sept. 12, 2007

Boston College, Chemistry Department, Sept. 10, 2007

University of Massachusetts at Dartmouth, Chemistry Department, Oct 25, 2006.

University of New Hampshire, Chemistry Department, Nov 21, 2006.
Amherst College, Chemistry Department, 2005.

Scheduled Seminars (invited)

California Institute of Technology, Chemistry, June 14, 2008
University of California, San Diego, Department of Chemistry, June 6, 2008
University of California, Irvine, Department of Chemistry, Mar 20, 2008
University of Illinois, Champaign Urbana, Department of Chemistry, May 8, 2008
SUNY Albany, Chemistry, April 22, 2008