

## MARTIN ASHLEY CASE, Ph.D.

Assistant Professor of Chemistry and Materials Science

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### EDUCATION

Dates	Institution	Major	Degree
1987-1991	University of Birmingham, UK	Chemistry	Ph.D
1983-1987	University of Birmingham, UK	Chemistry	B.Sc

### PROFESSIONAL EXPERIENCE

2007-present	University of Vermont, Burlington VT	Assistant Professor of Materials Science
2003-present	University of Vermont, Burlington VT	Assistant Professor of Chemistry
1999-2003	Princeton University, Princeton NJ	Research Staff Member and Lecturer
1996-1999	Princeton University, Princeton NJ	Postdoctoral Associate
1991-1996	Scripps Research Institute, La Jolla CA	Postdoctoral Fellow

### PUBLICATIONS – PEER REVIEWED

#### Corresponding author in bold, ISI impact factor in parentheses

- Roy, L.; **Case, M. A.** Electrostatic determinants of stability in antiparallel 3-stranded coiled coils. Submitted.
- LeBruin, L. T.; Banerjee, S.; O'Rourke, B.; **Case, M. A.** Metal ion-assembled micro-collagen heterotrimers. *Biopolymers* **2011**, in press.
- Roy, L.; **Case, M. A.** Recursively enriched dynamic combinatorial libraries for the self-selection of optimally stable proteins. *J. Phys. Chem. B* **2011**, *115*, 2454-2464. (4.19)
- Roy, L.; **Case, M. A.** Protein core packing by dynamic combinatorial chemistry. *J. Am. Chem. Soc.* **2010**, *132*, 999-999. (8.09)
- Roy, L.; **Case, M. A.** Electrostatic determinants of stability in parallel 3-stranded coiled coils. *Chem. Comm.* **2009**, 192-194. (5.34)
- Richardson, A.; Banerjee, S.; Wright, J.; **Case, M.**; **Savin, D.** Transition metal binding in designed peptide block copolymer micelles." *Polym. Mater. Sci. Eng.* **2007**, *97*, 38.
- Balakrishnan, G.; Hu, Y.; Case, M. A.; **Spiro, T. G.** Microsecond melting of a folding intermediate in a coiled-coil peptide, monitored by T-jump/UV Raman spectroscopy. *J. Phys. Chem. B* **2006**, *110*, 19877-19883. (4.19)
- Case, M. A.**; McLendon, G. L. Metal-assembled modular proteins: toward functional protein design. *Accts. Chem. Res.* **2004**, *37*, 754-762. (12.18)
- Balakrishnan, G.; Case, M. A.; Pevsner, A.; Zhao, X. J.; Tengroth, C.; McLendon, G. L.; **Spiro, T. G.** Time-resolved absorption and UV resonance Raman spectra reveal stepwise formation of T quaternary contacts in the allosteric pathway of hemoglobin. *J. Mol. Biol.* **2004**, *340*, 843-856. (4.15)
- Balakrishnan, G.; Tsai, C.-H.; Wu, Q.; Case, M. A.; Pevsner, A.; McLendon, G. L.; Ho, C.; **Spiro, T. G.** Hemoglobin site-mutants reveal dynamical role of interhelical H-bonds in the allosteric pathway: time-resolved UV resonance Raman evidence for intra-dimer coupling. *J. Mol. Biol.* **2004**, *340*, 857-868. (4.15)
- Puranik, M.; Nielsen, S. B.; Youn, H.; Hvitved, A. N.; Bourassa, J. L.; Case, M. A.; Tengroth, C.; Balakrishnan, G.; Thorsteinsson, M. V.; Groves, J. T.; McLendon, G. L.; Roberts, G. P.; **Olson, J. S.**; **Spiro, T. G.** Dynamics of carbon monoxide binding to CooA. *J. Biol. Chem.* **2004**, *279*, 21096-21108. (5.52)

12. Doerr, A. J.; Case, M. A.; Pelczer, I.; **McLendon, G. L.** Design of a functional protein for molecular recognition: specificity of ligand binding in a metal-assembled protein cavity probed by <sup>19</sup>F NMR. *J. Am. Chem. Soc.* **2004**, *126*, 4192-4198. (8.09)
13. Ren, Y.; Wang, W.-H.; Wang, Y.-H.; Case, M.; Qian, W.; **McLendon, G.**; Huang, Z.-X. Mapping the electron transfer interface between cytochrome *b*<sub>5</sub> and cytochrome *c*. *Biochemistry* **2004**, *43*, 3527-3536. (3.38)
14. **Gochin, M.**; Guy, R. K.; Case, M. A. A metalloprotein assembly of the HIV-1 gp41 coiled coil is an ideal receptor in fluorescence detection of ligand binding. *Angew. Chem. Int. Ed.* **2003**, *42*, 5325-5328. (10.88)
15. Zheng, Y.; Case, M. A.; Wishart, J. F.; **McLendon, G. L.** Do main chain hydrogen bonds create dominant electron transfer pathways? An investigation in designed proteins. *J. Phys. Chem. B.* **2003**, *107*, 7288-7292. (4.19)
16. Cooper, H. J.; Case, M. A.; McLendon, G. L.; **Marshall, A. G.** Electrospray ionization Fourier transform ion cyclotron resonance mass spectrometric analysis of metal-ion selected dynamic protein libraries. *J. Am. Chem. Soc.* **2003**, *125*, 5331-5339. (8.09)
17. **Case, M. A.**; McLendon, G. L.; Hu, Y.; Vanderlick, T. K.; Scoles, G. Using nanografting to achieve directed assembly of de novo designed metalloproteins on gold. *Nano Lett.* **2003**, *3*, 425-429. (10.37)
18. **Gochin, M.**; Khorosheva, V.; Case, M. A. Structural characterization of a paramagnetic metal-ion-assembled three-stranded  $\alpha$ -helical coiled coil. *J. Am. Chem. Soc.* **2002**, *124*, 11018-11028. (8.09)
19. Kipp, R. A.; Case, M. A.; Wist, A. D.; Cresson, C. M.; Carrell, M.; Griner, E.; Wiita, A.; Albinia, P. A.; Chai, J. J.; Shi, Y. G.; Semmelhack, M. F.; **McLendon, G. L.** Molecular targeting of inhibitor of apoptosis proteins based on small molecule mimics of natural binding partners. *Biochemistry* **2002**, *41*, 7344-7349. (3.38)
20. Wei, Y.; McLendon, G. L.; **Hamilton, A. D.**; Case, M. A.; Purring, C. B.; Lin, Q.; Park, H. S.; Lee, C.-S.; Yu, T. Disruption of protein-protein interactions: design of a synthetic receptor that blocks the binding of cytochrome *c* to cytochrome *c* peroxidase. *Chem. Commun.* **2001**, 1580-1581. (5.34)
21. Moffet, D. D.; Case, M. A.; House, J. C.; Vogel, K.; Williams, R.; Spiro, T. G.; McLendon, G. L.; **Hecht, M. H.** Carbon monoxide binding by de novo heme proteins from a designed combinatorial library. *J. Am. Chem. Soc.* **2001**, *123*, 2109-2115. (8.09)
22. Case, M. A.; **McLendon, G. L.**; A virtual library approach to investigate protein folding and internal packing. *J. Am. Chem. Soc.* **2000**, *122*, 8089-8090. (8.09)
23. Mutz, M. W.; Case, M. A.; Wishart, J. F.; Ghadiri, M. R.; **McLendon, G. L.** De novo design of protein function: predictable structure-function relationships in synthetic redox proteins. *J. Am. Chem. Soc.* **1999**, *121*, 858-859. (8.09)
24. Zhou, J.; Case, M. A.; Wishart, J. F.; **McLendon, G. L.** Thermodynamic and structural effects of a single backbone hydrogen bond deletion in a metal-assembled helical bundle protein. *J. Phys. Chem. B.* **1998**, *102*, 9975-9980. (4.19)
25. Case, M. A.; Ghadiri, M. R.; Mutz, M. W.; **McLendon, G. L.** Stereoselection in designed three-helix bundle metalloproteins. *Chirality* **1998**, *10*, 35-40. (2.21)
26. **Ghadiri, M. R.**; Case, M. A. De-novo design of a novel heterodinuclear 3-helix bundle metalloprotein. *Angew. Chem. Int. Ed.* **1993**, *32*, 1594-1597. (10.88)
27. **Baggett, N.**; Case, M. A.; Darby, P. R.; Gray, C. J. Action of almond  $\beta$ -D-glucosidase on fluorogenic substrates derived from 4-substituted 7-hydroxycoumarins. *Enz. Microb. Tech.* **1993**, *15*, 742-748. (2.38)
28. **Baggett, N.**; Case, M. A.; Darby, P. R.; Gray, C. J. 7-Hydroxycoumarin-4-acetylhydrazide - a fluorescent derivatizing reagent for aldehydes and ketones. *Anal. Chim. Acta* **1992**, *265*, 111-115. (3.15)
29. **Baggett, N.**; Case, M. A.; Foulon, J. D.; Gray, C. J.; Hamor, T. A. The rearrangement of coumarin-4-acetylhydrazides - structure of 1-amino-4-(2-hydroxy-4-methoxyphenyl)-2,6(1H, 3H)-pyridinedione. *Acta Cryst. C* **1991**, *47*, 1670-1672. (0.56)

30. **Baggett, N.**; Case, M. A.; Darby, P. R.; Gray, C. J. 7-  $\beta$ -D-Galactopyranosyloxycoumarin-4-acetic acid and its methyl ester as substrates for the  $\beta$ -D-galactosidase of E.coli. *Carbohydr. Res.* **1990**, *197*, 295-301. (1.96)

## PRESENTATIONS

### Peer Reviewed

1. 08/2010 240<sup>th</sup> National Meeting of the American Chemical Society, Boston MA (2 talks)
2. 05/2009 13<sup>th</sup> Annual NSTI NanoTech, Houston, TX
3. 07/2008 22<sup>nd</sup> Annual Symposium of the Protein Society, San Diego CA (poster)
4. 06/2008 Gordon Research Conference on Biopolymers, Newport RI (poster)
5. 09/2007 234<sup>th</sup> National Meeting of the American Chemical Society, Boston MA (2 talks)
6. 09/2006 232<sup>nd</sup> National Meeting of the American Chemical Society, San Francisco CA
7. 07/2006 1<sup>st</sup> Metalloprotein and Protein Design Conference, Chicago IL
8. 08/2005 230<sup>th</sup> National Meeting of the American Chemical Society, Washington DC
9. 06/2004 7<sup>th</sup> International Symposium on Biomolecular Chemistry – ISBOC-7, Sheffield UK
10. 08/2003 4<sup>th</sup> Conference on Protein and Peptide Self-Assembly, Crete (invited)
11. 04/2003 225<sup>th</sup> National Meeting of the American Chemical Society, New Orleans LA
12. 06/2002 Gordon Research Conference on Combinatorial Chemistry, Oxford UK (poster)
13. 08/2000 220<sup>th</sup> National Meeting of the American Chemical Society, Washington DC
14. 06/2000 34<sup>th</sup> International Conference on Coordination Chemistry, Edinburgh, Scotland
15. 08/1999 218<sup>th</sup> National Meeting of the American Chemical Society, New Orleans LA
16. 07/1999 13<sup>th</sup> Annual Symposium of the Protein Society, Boston, MA (poster)
17. 12/1995 Pacifichem '95: 1995 International Chemical Congress of Pacific Basin Societies, Honolulu HI

### Invited, Not Peer Reviewed (interview presentations are not listed)

1. 10/2010 Fall Seminar Series, Department of Chemistry, Dartmouth College, Hanover NH
2. 07/2010 38<sup>th</sup> American Chemical Society Northeast Regional Meeting, Potsdam NY
3. 09/2009 Fall Seminar Series, Department of Chemistry, University of Massachusetts at Dartmouth, Dartmouth MA
4. 02/2009 Spring Seminar Series, Department of Chemistry, University of Rhode Island, Kingston RI
5. 01/2009 Spring Seminar Series, Ottawa Health Research Institute, Ottawa Canada
6. 06/2008 36<sup>th</sup> American Chemical Society Northeast Regional Meeting, Burlington VT
7. 05/2007 11<sup>th</sup> Annual NSTI NanoTech, Santa Clara, CA (invited Keynote presentation)
8. 10/2006 Fall Seminar Series, Department of Chemistry, Clarkson University, Potsdam NY
9. 10/2006 Fall Seminar Series, Department of Chemistry, Tufts University, Medford MA
10. 03/2006 Spring Seminar Series, Department of Chemistry, SUNY Potsdam, Potsdam NY
11. 03/2006 Spring Seminar Series, Department of Chemistry, St Lawrence University, Canton NY
12. 04/2004 Spring Seminar Series, Department of Chemistry, Amherst College, Amherst MA

## PATENTS AND INVENTIONS

1. McLendon, G. L.; Kipp, R. A.; Case, M. A.; Shi, Y.; Semmelhack, M. F.; Albiniak, P. A.; Wist, A. IAP binding compounds. US Pat. 7718600 issued **2010**
2. McLendon, G. L.; Kipp, R. A.; Case, M. A.; Shi, Y. IAP binding peptides and assays for identifying compounds that bind IAP. US Pat. 10478521 application filed **2002**

## GRANTS

### Current Support

**DMR 0907599 (Case)** 06/15/09 – 05/31/12 \$300,000  
National Science Foundation  
*Self-Assembled Collagen Networks of Predictable Topologies*  
Role: PI

### Completed Support

**DMR 0722451 (Headrick)** 09/01/07 – 08/30/10 \$188,520  
National Science Foundation  
*MRI: Development of a System for Thin Film Deposition of Highly Ordered Organic Materials*  
Role: Co-PI

**G40822-G4 (Case)** 03/01/04 – 02/28/07 \$35,000  
ACS Petroleum Research Fund  
*Multianalyte Photoelectrochemical Sensors from Designed Proteins*  
Role: PI

**CHE 0106342 (McLendon)** 08/15/01 – 08/14/04 \$450,000  
National Science Foundation  
*De novo Design of Helical Electron Transfer Metalloproteins*  
Role: Co-PI

**Small Equipment Grant (Case)** 09/01/03 – 12/31/03 \$16,000  
Vermont EPSCoR  
*Protein Design by Dynamic Combinatorial Chemistry*  
Role: PI

## TEACHING

Course	Title	Credit Hours	Class Size	Notes
CHEM23/25	Introduction to General Chemistry	4	100	One semester survey course Includes laboratory
CHEM36	General Chemistry II	4	40	2 <sup>nd</sup> of a two semester sequence for Chemistry Majors. Includes laboratory
CHEM39/40	Introduction to Laboratory Research	2	10	Research experience for Chemistry Majors
CHEM141	Organic Chemistry I	4	150	1 <sup>st</sup> of a two semester sequence for non-Chemistry Majors. Includes laboratory
CHEM143	Organic Chemistry I	4	40	1 <sup>st</sup> of a two semester sequence for Chemistry Majors Includes laboratory
BIOC205	Biochemistry I	3	60	1 <sup>st</sup> of a two semester sequence for undergraduate upperclassmen and graduate students. Nominated for UVM Kroepsch-Maurice teaching award
CHEM258	Special Topics: Chemical Biology	3	10	Advanced class. Nominated for UVM Kroepsch-Maurice teaching award

## SERVICE

### Departmental Service

Graduate Standards Committee	09/2003 – present 09/2006 – 01/2011	Chair
Instrumentation Committee	09/2003 – present	
Faculty Search Committee (Inorganic)	08/2004 – 03/2005 08/2005 – 03/2006 08/2006 – 03/2007	
Faculty Search Committee (Organic)	08/2005 – 03/2006	
Graduate Brochure Committee	05/2006 – present	
Co-organizer, Humphrey Symposium	Fall 2004	

### College Service

College Honors and Individually Designed Majors/Minors Committee	09/2005 – 05/2008
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### University Service

*Faculty member* UVM Graduate College  
*Faculty affiliate* UVM Polymer and Composites Group  
*Faculty affiliate* Vermont Cancer Center

*Graduate and Undergraduate student advising* Advisees include 25 undergraduate Chemistry and Biochemistry majors, and graduate students in the Departments of Chemistry, Biochemistry, Physics, Materials Science, and Mechanical Engineering through service on thesis committees.

### Professional Service

American Chemical Society (ACS)	Member since 1992 Program Chair ACS Northeast Regional Meeting 2008 Alternate Councilor and executive committee member, ACS Green Mountain local section Co-organizer National Chemistry Week 2005 and 2007
Federation of American Societies for Experimental Biology (FASEB)	Member 1996 – present
Royal Society of Chemistry (RSC)	Member and Chartered Chemist 2001 – present

### Grant Review Panels

National Science Foundation

### Ad Hoc Grant Reviews

National Science Foundation  
Research Corporation of America  
ACS Petroleum Research Foundation

### Ad Hoc Reviews for Journals

Journal of the American Chemical Society  
Nature Chemistry  
Journal of Physical Chemistry  
Journal of Inorganic Biochemistry  
Langmuir  
Protein Science  
Bioorganic and Medicinal Chemistry  
Molecular Biosystems

### Community and Outreach

Mentor, ACS Project SEED, 2010 – present  
Co-organizer, National Chemistry Week Activities 2005 and 2007  
Judge, Vermont State Math and Science Fair, 2004 – present

## **COLLABORATORS & OTHER AFFILIATIONS**

### **PhD and Postdoctoral Advisors**

Neil Baggett (PhD)	University of Birmingham, UK
Charles J. Gray (PhD)	University of Birmingham, UK
M. Reza Ghadiri (Post-doctoral)	Scripps Research Institute, La Jolla CA
George L. McLendon (Post-doctoral)	Duke University, Durham NC

### **Collaborators**

Mark Rould	University of Vermont, Burlington VT
Daniel Savin	University of Southern Mississippi, Hattiesburg MS
Frederic Sansoz	University of Vermont, Burlington VT
Igor Sokolov	Clarkson University, Canton NY
Walter Varhue	University of Vermont, Burlington VT

### **Current Graduate Students (2)**

Sunandan Banerjee  
Liton Roy

### **Former Graduate Students (4)**

Lyndelle T. LeBruin  
Sandeep Naik (advisor of record)  
Graham A. Ogilvie  
Nathan B. Mahany

### **Former Postdoctoral Associates (1)**

Dr. Tania Dey