

Robert L. McFeeters

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Research Group Website: <http://www.uah.edu/faculty/mcfeetersrl>

Core Competencies: protein biochemistry, molecular biology, structural biology, receptor-ligand binding, molecular pharmacology, biophysics and macromolecular interactions

Employment:

2014-present **Associate Professor of Chemistry, University of Alabama, Huntsville, AL**

2008-2014 **Assistant Professor of Chemistry, University of Alabama, Huntsville, AL**

- Built and managed productive research group consisting of a Research Associate, Laboratory Technician, and 8 graduate students
- Published 14 peer reviewed articles, 10 as corresponding author
- Featured expose in International Innovations April 2013
- High resolution structure/function studies of essential bacterial peptidyl-tRNA hydrolases (Pth1s) using NMR, X-ray & Neutron Diffraction, and small angle scattering
- Identified the first Pth1 inhibitors from natural products and synthetic sources
- Identified & pharmacologically characterized two distinct phylogenetic clades for Pth1
- Structurally engineered the antiviral lectin Scytovirin to have improved efficacy
- Uncovered reactivation of latent T-cells by Scytovirin
- Recombinantly produced major fungal virulence factor
- Successfully obtained intramural and extramural funding
- Invited to give 12 research talks
- Twice received Excellence in Teaching recognition from University Provost

Education and Research Experience:

2002-2008 **Post-doctoral Fellow, National Cancer Institute, Frederick, MD**

Postdoctoral Advisor: R. Andrew Byrd, Structural Biophysics Laboratory

- Published 5 articles, 3 as primary author
- Solved solution structure of novel antiviral lectin Scytovirin
- Solved solution structure of *Y. pestis* thermo-osmotic regulator YmoA
- Created new method of measuring residual dipolar couplings
- Investigated interaction of Interleukin-13 with extracellular receptor in solution

1995-2002 **Ph.D. in Molecular Medicine, Cornell University, Ithaca, NY**

Graduate Advisor: Robert Oswald. Thesis Title: Characterizing Ionotropic Glutamate Receptor Structure/Function by Nuclear Magnetic Resonance

- 4 publications, 3 as primary author
- Sequentially assigned one of largest proteins in BRMB database
- Characterized backbone dynamic properties of ionotropic glutamate receptor
- Awarded USAMRMC Breast Cancer Research Predoctoral Fellowship
- Awarded PhRMA Advanced Predoctoral Fellowship

1993-1995 Undergraduate Research Associate, Laboratory of Atmospheric and Space Physics University of Colorado, Boulder, CO

- Instrument design for Student Nitrous Oxide Explorer (SNOE) satellite
- Ground support for CASSINI Saturn Observer
- Experience in electronics design and fabrication, computer aided drafting, spectrophotometric instrument assembly, high vacuum systems, and photon counting

1991-1995 B.S. Engineering Physics, University of Colorado, Boulder, CO

Graduated *magna cum laude* with distinction. Minor in Applied Math.

Honor's Thesis Title: Two Dimensional Density Mapping of Photosystem II Using Transmission Electron Microscopy

2013-present Editor for JSM Biotechnology & Biomedical Engineering

Awards, Honors, and Fellowships:

Featured in April 2013 International Innovations

NIH Post-doctoral Fellowship, 2002-2008

USAMRMC Breast Cancer Research Predoctoral Fellowship

PhRMA Advanced Predoctoral Fellowship

Member ΣΠΣ (Physics), τβπ (Engineering), Gold Key (Academic) honor societies

Publications:

V. Vandavasi, K. Taylor-Creel, R. L. McFeeters, L. Coates and H. McFeeters, Recombinant Production, Crystallization, and X-ray Crystallographic Structure Determination of Peptidyl-tRNA Hydrolase from *S. typhimurium*, Acta Crystallographica Section F, *in press*.

K. Taylor-Creel, M. C. Hames, W. B. Holloway, H. McFeeters, R. L. McFeeters, Expression, Purification, and Solubility Optimization of Peptidyl-tRNA Hydrolase 1 from *Bacillus cereus*, Protein Expression and Purification, 95, 259-264, 2014

M. C. Hames, H. McFeeters, W. B. Holloway, C. B. Stanley, V. S. Urban, R. L. McFeeters, Small Molecule Binding, Docking, and Characterization of the Interaction between Pth1 and Peptidyl-tRNA, International Journal of Molecular Sciences, 14, 22741-22752, 2013

R. L. McFeeters, Recent Antimicrobial Developments Targeting Peptidyl-tRNA Hydrolases, JSM Biotechnology & Biomedical Engineering, 1(1):1006, 2013

H. McFeeters, M. J. Gilbert, A. M. Wood, C. B. Haggemaker, J. Jones, O. Kutsch, R. L. McFeeters, Scytovirin Engineering Improves Carbohydrate Affinity and HIV-1 Entry Inhibition, Biochemistry and Physiology, S2-003, 2013

J. K. Baird, R. L. McFeeters, Effects of Hydrodynamic Convection and Interionic Electrostatic Forces on Protein Crystallization, Crystal Growth and Design, 13:1889-1898, 2013

J. K. Baird, R. L. McFeeters, K. G. Caraballo, Specific Rate of Protein Crystallization Determined by the Guggenheim Method, International Journal of Thermophysics, 2013

R. C. Hughes, H. McFeeters, L. Coates, R. L. McFeeters, Recombinant Production, Crystallization and X-ray Crystallographic Structure Determination of the Peptidyl-tRNA Hydrolase of *P. aeruginosa*, Acta Crystallographica Section F, 68(12):1472-1476, 2012
H. McFeeters, R. L. McFeeters, Antifungal Approaches to the Recurring Threat of *Botrytis cinerea*, International Journal of Modern Botany, 2(5):127-144, 2012

S. Rathi, H. McFeeters, R. L. McFeeters*, M. R. Davis, Purification and Phytotoxic Analysis of *Botrytis cinerea* Virulence Factors: New Avenues for Crop Protection, Agriculture, 2(3):154-164, 2012 *corresponding author

H. McFeeters, M. J. Gilbert, R. M. Thompson, W. N. Setzer, L. R. Cruz-Vera, and R. L. McFeeters, Inhibition of Essential Bacterial Peptidyl-tRNA Hydrolase Activity by Tropical Plant Extracts, Natural Products Communications, 7(8):1107-1110, 2012

T. M. Sabo, D. Bakhtiari, K. F. A. Walter, R. L. McFeeters, K. Giller, S. Becker, C. Griesinger, D. Lee, Thermal Coefficients of the Methyl Groups within Ubiquitin, Protein Science, 21(4):562-570, 2012

S. M. Harris, H. McFeeters, I. V. Ogungbe, L. R. Cruz-Vera, W. N. Setzer, B. R. Jackes, R. L. McFeeters, Peptidyl-tRNA Hydrolase Screening Combined with Molecular Docking Reveals the Antibiotic Potential of *Syzygium johnsonii* Bark Extract, Natural Products Communications, 6(10):1421-1424, 2011

R. Chandrashekar, O. Salem, H. Křížová, R. L. McFeeters, P. Adams, A Switch I Mutant of Cdc42 Exhibits Decreased Conformational Freedom, Biochemistry, 50(28):6196-6207, 2011

T. J. Giesy, A. S. Chou, R. L. McFeeters, J. Baird, Critical-point Universality in Adsorption: The Effect of Charcoal on a Mixture of Isobutyric Acid and Water Near the Consolute Point, Physical Review E, 83(6-1):0612011-0612018, 2011

Post-Doctoral

R. Das, J. Mariano, Y. C. Tsai, R. C. Kalathur, Z. Kostova, J. Li, S. G. Tarasov, R. L. McFeeters, A. S. Altieri, X. Ji, R. A. Byrd, A. M. Weissman, Allosteric Activation of E2-RING Finger-Mediated Ubiquitylation by a Structurally Defined Specific E2-Binding Region of gp78, Molecular Cell, 34, 674-685, 2009

R. L. McFeeters, C. Xiong, B. R. O'Keefe, H. Bokesch, J. B. McMahon, D. M. Ratner, R. Castelli, P. H. Seeberger, R. A. Byrd, The Novel Fold of Scytovirin Shows a New Twist for Antiviral Inhibitors, Journal of Molecular Biology, 369:451-461, 2007

R. L. McFeeters, A. S. Altieri, S. Cherry, J. E. Tropea, D. S. Waugh, R. A. Byrd, High Resolution Solution Structure of *Yersinia* Modulating Protein YmoA Provides Insight into its Interaction with H-NS, Biochemistry, 46:13975-13982, 2007

R. A. Byrd, C. A. Fowler, R. L. McFeeters, V. Gaponenko, Novel Uses of Paramagnets to Solve Complex Protein Structures, Handbook of Modern Magnetic Resonance, Pharmaceutical Sciences, D. Craik, Section Editor, Springer 2006

R. L. McFeeters, C. A. Fowler, V. V. Gaponenko, R. A. Byrd, Efficient and Precise Measurement of $H^\alpha-C^\alpha$, $C^\alpha-C'$, $C^\alpha-C^\beta$ and H^N-N Residual Dipolar Couplings from 2D H^N-N Correlation Spectra, *Journal of Biomolecular NMR*, 31:35-47, 2005

Graduate

R. L. McFeeters, R. E. Oswald, Emerging Structural Explanations of Ionotropic Glutamate Receptor Function, *FASEB Journal*, 18(3):428-438, 2004

R. L. McFeeters, R. E. Oswald, Structural Mobility of the Extracellular Ligand-Binding Domain of an Ionotropic Glutamate Receptor: Analysis of NMR Relaxation Dynamics, *Biochemistry*, 41(33):10472-10481, 2002

R. L. McFeeters, G. V. T. Swapna, G. T. Montelione, R. E. Oswald, Semi-Automated Backbone Resonance Assignments of the Extracellular Ligand-Binding Domain of an Ionotropic Glutamate Receptor, *Journal of Biomolecular NMR*, 22(3):297-298, 2002

R. E. Oswald, T. M. Suchyna, R. L. McFeeters, P. Gottlieb, F. Sachs, Solution Structure of Peptide Toxins that Block Mechanosensitive Ion Channels, *Journal of Biological Chemistry*, 277(37):3443-3450, 2002

Undergraduate

K. Marr, R. L. McFeeters, M. K. Lyons, Isolation and Structural Analysis of Two-dimensional Crystals of Photosystem II from *Hordeum vulgare viridis* zb^{63} , *Journal of Structural Biology*, 117:86-98, 1996

Invited Talks and Presentations:

Mississippi State University, Department of Chemistry, Invited Lecture 2014
Middle Tennessee State University, Department of Biology, Invited Lecture 2013
Mississippi Regional Biophysics Consortium, Invited Talk, 2013
University of Colorado Denver, Department of Chemistry, Invited Lecture, 2012
American Chemical Society Madison Marshall Symposium, Invited Talk, 2011
American Council for Medicinally Active Plants Conference, Invited Short Talk, 2011
Masaryk University, CEITEC Structural Biology and Biochemistry, Invited Lecture, 2011
Auburn University, Department of Chemistry, Invited Lecture, March 2011
University of Arkansas, Invited Lecture, November, 2010
Vanderbilt University, Department of Chemistry and Biology, Invited Lecture, 2010
University of Illinois Chicago, Dept. of Biochem. & Molecular Genetics, Invited Lecture, 2009
South Eastern Magnetic Resonance Conference, Short Talk 2009

Teaching Experience:

Instructor for General Chemistry I & II, Elementary Biochemistry, General Biochemistry I & II, Graduate Biochemistry I & II, Chemistry and Biotechnology Seminar Series
2010 & 2012 University of Alabama System Effective Teaching Workshop
2005 & 2007 NIH Active Learning and Effective Teaching Techniques Workshop

Memberships:

American Chemical Society
Sigma Xi Scientific Research Society
American Council for Medicinally Active Plants

Grants Awarded:

National Institutes of Health R15

Dr. Robert McFeeters (PI), Title: "Pattern Specific Labeling of Aromatic Amino Acids", Agency: NIH, Submitted: September 2009, Duration: 3 Years, April 2010 – March 2013, Budget \$436,086

American Chemical Society: Herman Frasch Foundation Grant

Dr. Robert McFeeters (PI), Title: "The SNOD1 Virulence Factor of *Botrytis cinerea*: Structure, Interactions, Mechanism of Infection, and Means to Inhibit Crop Rot", Agency: American Chemical Society, August 2012 –July 2017, Duration: 5 years, Budget \$250,000

UAHuntsville Distinguished Junior Faculty Development Grant

Dr. Robert McFeeters (PI), Title: "Structural Engineering of Scytovirin for Improved antiHIV Activity," Agency: UAHuntsville, Submitted: November 2008, Duration: 1 year, Budget \$10,000

ORAU Visiting Industrial Speaker Award

Dr. Robert McFeeters (PI), Title: "Seminar Invitation for Khursheed Anwer of EGEN Inc.", Agency: Oak Ridge Associated Universities, Submitted: December 2009, Budget: \$600

UAHuntsville Research Infrastructure Investment Grant

Dr. Robert McFeeters (PI), Title: "Enhancing the Antiviral Properties of the Carbohydrate Binding Entry Inhibitor Scytovirin", Agency: UAHuntsville, March 2010, Duration: 1 year, Budget: \$30,000; partially awarded

UAHuntsville Research Infrastructure Investment Grant

Dr. Roger Cruz-Vera (PI), Dr. Robert McFeeters (Co-I), Title: "Inhibiting Peptidyl-tRNA Hydrolase 1: The Foundation for Next Generation Antibiotics", Agency: UAHuntsville, March 2010, Duration: 1 year, Budget: \$35,000

UAHuntsville Distinguished Junior Faculty Development Grant

Dr. Robert McFeeters (PI), Title: "The SNOD1 Virulence Factor of *Botrytis cinerea*" Agency: UAHuntsville, Submitted: November 2011, Duration: 1 year, Budget \$10,000

UAH IIRD Pattern Specific Aromatic Labeling & Membrane Proteins

Dr. Robert McFeeters (PI), Title: "Pattern Specific Aromatic Labeling Methodology to Study Membrane Proteins", Agency: UAHuntsville, Submitted: January 2013, Duration: 1 Year, April 2013 – March 2014, Budget \$35,000

Non-monetary Awards,

Oak Ridge National Laboratory, High Flux Reactor Experiment Time

Dr. Robert McFeeters (PI), Agency: Oak ridge National Laboratory, Submitted August 2010, Duration: 4 Days of Beam Time, Budget: N/A, Awarded for March 4 – 7, 2011

Oak Ridge National Laboratory, Spallation Neutron Source

Dr. Robert McFeeters (PI), Agency: Oak ridge National Laboratory, Submitted August 2010, Duration: 4.5 Days of Beam Time, Budget: N/A, Awarded for April 14-17, 2011