

# Robert L. McFeeters

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**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 18 peer reviewed articles, 13 as corresponding author
- Successfully obtained intramural and extramural (NIH, ACS) funding
- Invited to give 15 research talks and lectures
- Twice received Excellence in Teaching recognition from University Provost; 2010, 2012
- Featured expose in International Innovations; April 2013

## Research:

- 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 HIV-1 infected T-cells by Scytovirin
- Discovered fungal inhibition by Scytovirin
- Recombinantly produced a major fungal virulence factor

## 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

## Research:

- 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

## Research:

- 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**

- Performed instrument design for Student Nitrous Oxide Explorer (SNOE) satellite
- Participated in ground support for CASSINI Saturn Observer
- Gained 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:**

UAHuntsville Faculty Teaching Excellence Award, 2015

Featured in April 2013 International Innovations for Research Breakthroughs

UAHuntsville, Excellence in Teaching Recognition, 2010 & 2013

UAHuntsville, Junior Faculty Distinguished Research Award, 2009 & 2012

NIH Post-doctoral Fellowship, 2002-2008

USAMRMC Breast Cancer Research Predoctoral Fellowship, 1997

PhRMA Advanced Predoctoral Fellowship, 1997

**Publications:**

W. B. Holloway, H. McFeeters, A. M. Powell, G. S. Nidadavolu, **R. L. McFeeters**, A Highly Adaptable Method for Quantification of Peptidyl-tRNA Hydrolase Activity, *Journal of Analytical and Bioanalytical Techniques*, 6(3), 2015.

H. McFeeters, **R. L. McFeeters**, Current Methods for Analysis of Enzymatic Peptidyl-tRNA Hydrolysis, *Journal of Analytical and Bioanalytical Techniques*, 5(5), 2014.

V. Surapuram, W. N. Setzer, **R. L. McFeeters**, H. McFeeters, Antifungal Activity of Plant Extracts against *Aspergillus niger* and *Rhizopus stolonifer*, *Natural Product Communications*, 9(11):1603-1605, 2014.

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*, 70(7):872-877, 2014.

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.

J. K. Baird, **R. L. McFeeters**, K. G. Caraballo, Specific Rate of Protein Crystallization Determined by the Guggenheim Method, *International Journal of Thermophysics*, 35(5):830-840 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):1006-1008, 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.

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, *Modern Magnetic Resonance*, pages 1255-1261, Gram Webb Editor, Springer Netherlands, 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.

#### **Memberships:**

American Chemical Society

Sigma Xi Scientific Research Society

American Society for Microbiology

American Council for Medicinally Active Plants

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

#### **Teaching Experience:**

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

### **Invited Talks and Lectures:**

University of Alabama Huntsville, Biology, Invited Lecture 2015  
BioAlabama, Invited Lecture 2015  
University of Alabama Birmingham, Biochemistry and Molec. Genetics, Invited Lecture 2015  
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

### **Grants Awarded:**

#### **National Institutes of Health R15**

Dr. Robert McFeeters (PI), Title: "Pattern Specific Labeling of Aromatic Amino Acids,"  
Agency: NIH, 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, Duration: 5 years, August 2012 – July 2017, Budget \$250,000.

#### **UAHuntsville Distinguished Junior Faculty Development Grant**

Dr. Robert McFeeters (PI), Title: "Structural Engineering of Scytovirin for Improved  
antiHIV Activity," Agency: UAHuntsville, Duration: 1 year, June 2009 – May 2010, 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, 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, Duration: 1 year, March 2010 –  
February 2011, Budget: \$30,000.

#### **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,  
Duration: 1 year, March 2010 – February 2011, Budget: \$35,000.

#### **UAHuntsville Distinguished Junior Faculty Development Grant**

Dr. Robert McFeeters (PI), Title: "The SNOD1 Virulence Factor of *Botrytis cinerea*",  
Agency: UAHuntsville, Submitted: Duration: 1 year, June 2012 – May 2013, Budget  
\$10,000.

**UAHuntsville IDR Pattern Specific Aromatic Labeling & Membrane Proteins**

Dr. Robert McFeeters (PI), Title: "Pattern Specific Aromatic Labeling Methodology to Study Membrane Proteins," Agency: UAHuntsville, 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.