

# Hana McFeeters, PhD

Research Assistant Professor  
University of Alabama in Huntsville

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## EDUCATION

University of Alabama in Huntsville, Huntsville, AL, 2009-2010

Completed classes in **Operations Management**, **Economics**, and **Introduction to Technology Development**

National Cancer Institute, Frederick, MD, 2008

Completed workshop on **Mass Spectrometry** organized by the Mass Spectrometry Center at the Laboratory of Proteomics and Analytical Technologies

Masaryk University Brno (Czech Republic) and Joseph Fourier University Grenoble (France)

**PhD in Physical Chemistry**, 2005 (Physical Chemistry)

Masaryk University Brno (Czech Republic)

**MSc in Physical Chemistry**, 2001

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## EXPERIENCE

New Century Pharmaceuticals, Huntsville, AL

**Consultant**, 01/2015 to Present

My role has been to develop (Phase 1) a set of protein based vaccines for various viruses. I have been responsible for experimental design, execution, data analysis, and, based on the outcomes, design of new experiments.

The University of Alabama in Huntsville, Huntsville, AL

**Research Assistant Professor**, 2012 to Present

My role has been to design experiments, analyze experimental data, introduce and validate new techniques and assays, maintain laboratory instruments in working order, prepare manuscripts for publication, grant proposals for submission, and mentor and assist undergraduate and graduate students working in the laboratory. I have been involved in several projects, including development of new antibacterials, antifungals, and viral entry inhibitors, as well as bacterial production of site specifically isotopically labeled aromatic amino acids.

- Designed and performed molecular biology experiments (plasmid isolation, cloning, site directed mutagenesis, PCR)
- Performed recombinant protein expression in bacteria and yeast
- Established culture growth of pathogenic bacteria and fungi in the laboratory
- Generated and interpreted experimental data using multiple techniques including HPLC, GC-MS, UV-VIS, NMR, SDS-PAGE, preparative and analytical FPLC, x-ray crystallography, neutron

crystallography, confocal microscopy, SANS, Western and Northern blotting to characterize molecules involved in pathogenic processes and their inhibition

- Introduced and validated susceptibility testing of pathogenic fungi inhibitors
- Performed routine instrument maintenance for HPLC and FPLC instruments, UV/VIS spectrophotometer, sonicator, thermocycler, table top and floor mounted centrifuges, pH meter, and other small laboratory instruments
- Authored and submitted research proposals for government and non-government grant organizations (NIH, DoE, ACS)
- Presented experimental data at regional and national scientific meetings
- Co-mentored research projects for 3 graduate and 4 undergraduate students, interacted with collaborators on regular basis to discuss project progress, experimental design, and funding strategies
- Authored multiple peer reviewed publications
- Teaching: General Chemistry (undergraduate), Elementary Biochemistry (undergraduate), Biochemistry (undergraduate)

The University of Alabama in Huntsville, Huntsville, AL

**Research Associate**, 2009 to 2011

My role was to assist in establishment of a new research laboratory, design and perform biochemical and biophysical experiments, perform general laboratory maintenance, and assist in mentoring students.

- Designed experiments, collected and interpreted experimental data using multiple techniques including HPLC, GC-MS, UV-VIS, NMR, SDS-PAGE, preparative and analytical FPLC, x-ray crystallography, Western and Northern blotting, molecular biology
- Performed recombinant protein expression in bacteria and yeast
- Developed and validated a new assay for fast determination of an essential bacterial enzyme activity
- Performed routine instrument maintenance for HPLC and FPLC instruments, UV/VIS spectrophotometer, sonicator, thermocycler, table top and floor mounted centrifuges, pH meter, and other small laboratory instruments
- Presented experimental data at regional and national scientific meetings
- Authored multiple peer reviewed publications
- Teaching: Biophysical Chemistry (undergraduate and graduate)

National Cancer Institute, Frederick, MD

**Postdoctoral Fellow**, 2005 to 2009

My role was to characterize protein:protein interactions involved in cancer using a variety of biophysical techniques.

- Designed experiments and collected and interpreted experimental data from analytical ultracentrifugation, dynamic and static light scattering, ITC, fluorescence polarization, CD spectroscopy, and NMR spectroscopy
- Performed recombinant protein expression in bacteria and yeast
- Purified proteins using reverse phase HPLC and various FPLC methods (cation and anion exchange, size exclusion, affinity chromatography)

- Routinely analyzed protein sample analysis by LC-MS (ESI)
- Presented results at national and international scientific meetings

Quality Control Laboratory at Brno Waterworks (Czech Republic)

**Laboratory Technician** during summers 1994-2001

My role was to perform routine analysis of wastewater samples (pH, oxygen content, cation and anion concentration, soluble and insoluble particle content and analysis) in an ISO 9001 accredited quality control setting.

## AWARDS

**Individual Investigator Distinguished Research (IIDR, The University of Alabama in Huntsville), 2014**

- Received funds (\$34,000) to study antiviral properties of the high mannose binding lectin Scytovirin

**Experimental Time at Spallation Neutron Source, Oak Ridge National Laboratory, 2014 and 2015**

- Awarded experimental time to acquire neutron diffraction data on crystals of novel protein target for antibacterial development

**Visiting Faculty Program Fellow at Oak Ridge National Laboratory, 2013**

- 10-week fellowship to perform experiments at DoE facility
- Performed protein crystallization and optimization of conditions for growth of large protein crystals for neutron diffraction studies

**Hamilton Company Polymeric HPLC Column Award, 2012**

- Proposal on developing a new technique to efficiently isolate and purify peptidyl-tRNA from bacterial cells
- Received two polymeric HPLC columns

**Doctorat en Cotutelle: Doctoral Fellowship Awarded by French Government, 2002-2005**

- Awarded graduate fellowship to spend 1.5 years at a French university as part of graduate studies

**Determination of High-Resolution Structures for the Post-Genomic Age, 2001**

- Participation in an international two-week course in Warsaw and Poznan (Poland) sponsored by Howard Hughes Medical Institute

**Chemistry Section Prize, 2001**

- Prize for one of the best MSc theses in the Chemistry Department at the Faculty of Science, Masaryk University, Brno (Czech Republic)

## PUBLICATIONS

Coates, L., Cuneo, M.J., Frost, M.J., He, J., Weiss, K.L., Tomanicek, S.J., McFeeters, H., Vandavasi, V.G., Langan, P., Iverson, E.B.: The Macromolecular Neutron Diffractometer MaNDi at the Spallation Neutron Source, *Journal of Applied Crystallography*, 2015, **48**: 1302-1306

Holloway, W.B., McFeeters, H., Powell, A.M., Nidadavolu, G.S., McFeeters, R.L.: A Highly Adaptable Method for Quantification of Peptidyl-tRNA Hydrolase Activity, *Journal of Analytical and Bioanalytical Chemistry*, 2015, **6**: 244.

**\*\*Article selected for the GenScript Scholar Club Program.**

McFeeters, H., McFeeters, R.L.: Current Methods for Analysis of Enzymatic Peptidyl-tRNA Hydrolysis, *Journal of Analytical and Bioanalytical Chemistry*, 2014, **5**: 215.

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

Vandavasi, V., Taylor-Creel, K., McFeeters, R.L., Coates, L., McFeeters, H.: Recombinant production, crystallization and X-ray crystallographic structure determination of the peptidyl-tRNA hydrolase of *Salmonella typhimurium*, *Acta Crystallographica F* 2014, **70**: 872-877

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

Hames, M.C., McFeeters, H., Holloway, W.B., Stanley, C.B., Urban, V.S., McFeeters, R.L.: Small Molecule Binding, Docking, and Characterization of the Interaction between Pth1 and Peptidyl-tRNA, *International Journal of Molecular Sciences* 2013, **14**(11): 22741-22752

McFeeters, H., Gilbert, M.J., Jones, J., Wood, A., Haggenger, C., Thompson, W., Kutsch, O., McFeeters, R.L.: Scytovirin Engineering Improves Carbohydrate Affinity and HIV-1 Entry Inhibition, *Biochemistry and Physiology* 2013, **S2**.

McFeeters, H., McFeeters, R.L.: Antifungal Approaches to the Recurring Threat of *Botrytis cinerea*, *International Journal of Modern Botany* 2012 **2**: 127-144

Hughes, R. C., McFeeters, H., Coates, L., McFeeters, R. L.: Recombinant production, crystallization and X-ray crystallographic structure determination of the peptidyl-tRNA hydrolase of *Pseudomonas aeruginosa*, *Acta Crystallographica F* 2012 **68**:1472-1476

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

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

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

Chandrasekhar, R., Salem, O., Křížová, H., McFeeters, R.L., Adams, P.D.: A switch I mutant of Cdc42 exhibits less conformational freedom, *Biochemistry* 2011 **50**:6196-6207

Macek P., Novák P., Křížová H., Židek L., Sklenář V.: Molecular dynamics study of major urinary protein-pheromone interactions: A structural model for ligand-induced flexibility increase, *FEBS Lett.* 2006 **580**: 682-684

Křížová H., Židek L., Stone M.J., Novotny M.V., Sklenář V.: Temperature-dependent spectral density analysis applied to monitoring backbone dynamics of major urinary protein-I complexed with the pheromone 2-*sec*-butyl-4,5-dihydrothiazole, *J. Biomol. NMR* 2004 **28**:369-384

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### ORAL PRESENTATIONS

Sewanee, The University of the South, Department of Chemistry, 2014  
New Frontiers in Neutron Macromolecular Crystallography, Oak Ridge National Laboratory, 2014  
Mississippi Biophysical Consortium, Jackson, 2014  
The University of Alabama in Huntsville, Department of Biology, 2012  
Jaks, Stats and Immunity, Keystone Symposia, 2007  
Summer School of Protein Folding and Protein Ligand Interactions, Greece, 2002  
16<sup>th</sup> NMR Valtice (NMR regional meeting), 2001  
Workshop of Biochemists and Molecular Biologists, Brno, 2001

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### TECHNOLOGY TOOLS

- Proficient in MS Windows, Linux, and UNIX
  - MS Office software (Excel, Word, PowerPoint, Outlook)
  - Basic programming skills in Python, C++
  - Mathematical software (Mathematica, Gnuplot)
  - Chemistry software (Chemsketch, Marvin sketch)
  - Graphics software (Canvas, Irfanview)
  - Worked with several different kinds of software to control HPLC (Hitachi, Varian), FPLC (Äkta)
  - NMR data collection, processing, and analysis software (Varian and Bruker, NMRPipe, Sparky)
  - Biomolecular structure analysis software (Chimera, Molmol, Pymol)
  - Macromolecular x-ray diffraction processing and analysis software (imosflm, ccp4, Coot, Phenix)
  - Bioinformatics tools (Protein and DNA analysis and alignment using tools available on ExPASy, protein structure prediction, PubMed, KEGG, Blast)
  - Bioanalysis software (ImageJ, pDraw32)
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### PROFESSIONAL MEMBERSHIPS

American Chemical Society, 2012-present  
American Society for Microbiology, 2014-present

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### LANGUAGES

- Czech (native)
  - English (proficient)
  - Spanish (beginner)
  - French (intermediate)
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- Green card holder