Tina Bunai, Ph.D.

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The College of William and Mary
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Education

Catholic University of America (CUA), B.S., Biology	1986-1990
University of Washington (UW), Ph.D., Analytical Chemistry	1990-1995
University of Washington, Post-doctoral, Proteomics	1996-1998

Experience

Research Associate Professor, The College of William and Mary (W&M) Jan 2006- present
Department of Applied Science
Conducting clinical proteomic research of cancers in collaboration with investigators at Eastern Virginia Medical School (EVMS) and INCOGEN, Inc. (a bioinformatics company). Forging new research efforts to expand Applied Research Center (ARC) and William and Mary Research Institute (WMRI) laboratory activities. Developing TOF-SIMS imaging of human tissues and single cells.

Associate Director, Proteomics, The Institute for Genomic Research (TIGR)
Pathogen Functional Genome Resource Center (PFGRC) August 2003 – Dec 2005
Direct the mass spectrometry-related research efforts within the Proteomics Lab of the PFGRC. Research included the profiling and characterization of pathogen bacterial proteomes including *Staphylococcus aureus* and *Yersinia pestis*.

Senior Director, Mass Spectrometry, Large Scale Biology Corporation (LSBC), Proteomics Division May 2001 – July 2003
Managed the Mass Spectrometry Department and oversaw a highly automated production environment for high throughput protein identification and characterization. Laboratory work flow consisted of: robotics for spot cutting of proteins from 2D gels, sample prep, MALDI spotting; 12 mass spectrometers for MALDI and LC-MS/MS data collection, customized bioinformatic tools for data analysis and storage in LSBC database. Responsible for project planning, balancing R & D with production. Supervised a staff of 11 people.

Senior Staff Scientist, LSBC August 1999 - May 2001
Developed and implemented methods for automated high-throughput capillary LC-MS/MS characterization of proteins separated via proprietary 2-D gel electrophoresis. Maintained equipment and trained personnel. Developed MS/MS data analysis strategy and interacted with bioinformatics department for implementation of automated high throughput analysis of peptide fragmentation spectra. Experience with laboratory space design.

Staff Scientist, Argonex Pharmaceuticals May 1998- August 1999

Scientific goal to identify antigenic peptides from selected cancer tumor cells using immunology and analytical chemistry methods. Implemented/improved analytical chemistry and biological mass spectrometry capabilities for purposes of antigen discovery.

Postdoctoral Fellow, UW Department of Molecular Biotechnology 1996- 1998
Adviser: John R. Yates III
Development of mass spectrometry instrumentation, particularly non-sheath electrospray (ES) interfaces for LC/MS and CE/MS. Development of nanospray-LC techniques for analysis of complex biological mixtures. Developed method for high amino acid sequence coverage of proteins to identify SNPs.

Graduate student, UW Department of Chemistry 1990-1995
Adviser: Frantisek Turecek
Thesis: "Studies of Transition Metal Complexes by Electrospray-Mass Spectrometry"
Specific transition-metal complexes were analyzed by ES-MS to aid in the understanding of the electrospray process. Studies of metal ion-peptide complexes for purposes of understanding gas-phase structure and reactions, and fragmentation to obtain amino acid sequence information.

Memberships

Member, American Society of Mass Spectrometry
Member, Association for Biomolecular Research Facilities

Publications (previous last name was Gatlin)

32. **C. L. Gatlin-Bunai**, L. Cazares, W. E. Cooke, O. J. Semmes, D. I. Malyarenko, "Enhanced sensitivity of MALDI-TOF MS detection of affinity-captured proteins spanning a 100 kDa mass range", submitted to J. Proteome Research, 2007.

31. R. Pieper, S.-T. Huang, P. P. Parmar, D. J. Clark, H. Alami, S. Kuntumalla, **C. L. Bunai**, R. D. Perry, R. D. Fleischmann, S. N. Peterson, "Characterization of the Membrane Proteome of the Plague Bacterium *Yersinia pestis*", submitted to J. Proteome Research, 2007.

30. K. Kwon, R. Pieper, S. Shallom, C. Grose, E. Kwon, Y. Do, S. Latham, H. Alami, S.-T. Huang, **C. Gatlin**, L. Papazisi, R. Fleischmann and S. Peterson, "A correlation analysis of protein characteristics associated with genome-wide high throughput expression and solubility of Streptococcus pneumonaie proteins", submitted to Genome Biology, **2007**.

29. R. Pieper, **C. L. Gatlin-Bunai**, E. Mongodin, P. Parmar, S.-T. Huang, D. J. Clark, G. L. Archer, R. D. Fleischmann, S. Gill, S. N. Peterson, "Comparative Proteomic Analysis of Staphylococcus aureus Strains with Differences in Resistance to the Cell Wall-Targeting Antibiotic Vancomycin", *Proteomics*, **2006**, 6, 4246-58.

28. **C. L. Gatlin**, R. Pieper, S.-T. Huang, E. Mongodin, E. Gebregeorgis, P. P. Parmar, D. J. Clark, H. Alami, L. Papazisi, R. D. Fleischmann, S. R. Gill, S. N. Peterson, "Proteomic Profiling of Cell Envelope-Associated Proteins from *Staphylococcus aureus*", *Proteomics*, **2006**, 6, 1530-1549.

27. K. T. Hogan, M. A. Coppola, **C. L. Gatlin**, L. W. Thompson, J. Shabanowitz, D. F. Hunt, V. H. Engelhard, M. M. Ross, C. L. Slingluff Jr., "Identification of Novel and Widely Expressed Cancer/Testis Gene Isoforms That Elicit Spontaneous Cytotoxic T-Lymhocyte Reactivity to Melanoma", *Cancer Research*, **2004**, 1157-1163.

26. N. L. Anderson, M. Polanski, R. Pieper, **T. Gatlin**, R. S. Tirumalai, T. P. Conrads, T. D. Veenstra, J. N. Adkins, J. G. Pounds, R. Fagan, A. Lobley, "The Human Plasma Proteome: A Non-Redundant List Developed by Combination of Four Separate Sources", *Mol. Cell. Proteomics* (on-line), Jan 12, **2004**, 1-74.

25. R. Pieper, **C. L. Gatlin**, A. J. Makusky, M. Mondal, M. Seonarain[2], E. Field, C. R. Schatz, M. A. Estock, N. Ahmed, A. M. McGrath, N. G. Anderson[3], S. Steiner, "Characterization Of The Human Urinary Proteome: A Reproducible Method For High-Resolution Display Of Urinary Proteins On 2-DE Gels With A Yield Of Nearly 1,400 Distinct Protein Spots", *Proteomics*, **2004**, 4, 000-000.

24. K. T. Hogan, M. A. Coppola, **C. L. Gatlin**, L. W. Thompson, J. Shabanowitz, D. F. Hunt, V. H. Engelhard, C. L. Slingluff Jr., M. M. Ross, "Identification of a shared epitope recognized by melanoma-specific, HLA-A3-restricted cytotoxic T lymphocytes", *Immunol. Letters*, **2003**, *90*, 131-135.

23. R. Pieper, **C. L. Gatlin**, A. J. Makusky, P. S. Russo, C. R. Schatz, S. S. Miller, Q. Su, A. McGrath, M. Estock, P. Parmar, M. Zhao, , S.-T. Huang, J. Zhou, F. Wang, R. Esquer-Blasco, N. L. Anderson, J. Taylor, S. Steiner, "The human serum proteome: display of nearly 3700 chromatographically separated protein spots on two-dimensional electrophoresis gels and identification of 325 distinct proteins", *Proteomics*, **2003**, *3*, 1345-1364.

22. V. Ramakrishna, M. M. Ross, M. Petersson**, C. L. Gatlin**, C. E. Lyons, C. L. Miller, H. E. Myers, M. McDaniel, L. R. Karns, R. Kiessling, G. Parmiani, D. C. Flyer, "Naturally occurring peptides associated with HLA-A2 in ovarian cancer cell lines identified by mass spectrometry are targets of HLA-A2-restricted cytotoxic T cells", *Intl. Immunology*, **2003**, 15, 751-763.

21. R. Pieper, Q. Su, **C. L. Gatlin**, S.-T. Huang, N. L. Anderson, S. Steiner, "Multi-Component Immunoaffinity Subtraction Chromatography, An Innovative Step Towards A Comprehensive Survey Of The Human Plasma Proteome", Proteomics, **2003**, *3*, 422-432.

20. S. Steiner, **C. L. Gatlin**, J. J. Lennon, A. M. McGrath, A. M. Aponte, A. J. Makusky, M. C. Rohrs and N. L. Anderson, "Cholesterol Biosynthesis Regulation and Protein Changes in Rat Liver following Treatment with Fluvastatin" Tox. Lett. **2001**, *120*, 369-377.

19. S. Steiner, **C. L. Gatlin**, J. J. Lennon, A. M. McGrath, A. M. Aponte, A. J. Makusky, M. C. Rohrs and N. L. Anderson, "Proteomics to Display Lovastatin-induced Protein and Pathway Regulation in Rat Liver" Electrophoresis **2000**, *21*, 777-782.

18. T. Vaisar, **C. L. Gatlin**, R. D. Rao, J. L. Seymour, F. Turecek, "Sequence information, distinction and quantitation of C-terminal leucine and isoleucine in ternary complexes of tripeptides with Cu(II) and 2,2'-bipyridine," *J. Mass Spectrom.* **2001**, *66*, 306-316.

17. **C. L Gatlin**, J. K. Eng, J. R. Yates III, S. T. Cross, J. C. Detter, "Automated identification of amino acid substitutions by HPLC/microspray tandem mass spectrometry with SEQUEST-SNP data analysis", *Anal. Chem.* **2000**, *72*, 757-763 (highlighted on the cover of this journal).

16. **C. L. Gatlin**, F. Turecek, "Quantitative electrospray ionization mass spectrometric studies of ternary complexes of amino acids with Cu^{2+} and phenanthroline", *J. Mass Spectrom.* **2000**, *35*, 172-177.

15. J. L. Kerwin, F. Turecek, R. Xu, K. J. Kramer, T. L. Hopkins, **C. L. Gatlin**, J. R. Yates III, "Mass spectrometric analysis of catechol-histidine adducts from insect cuticle," *Anal. Biochem.* **1999**, 268, 000-000.

14. **C. L. Gatlin**, G. R. Kleeman, L. G. Hays, A. J. Link, J. R. Yates III, "Protein identification at the low femtomole level from silver-stained gels using a new fritless electrospray interface for liquid chromatography-microspay and nanospray mass spectrometry," *Anal. Chem.* **1998**, *263*, 93-101.

13. J. R. Yates III, S. F. Morgan, **C. L. Gatlin**, P. R. Griffin, "Method to compare collision-induced dissociation spectra of peptides: potential for library searching and subtractive analysis," *Anal. Chem.* **1998**, *70*, 3557-3565.

12. F. Turecek and **C. L. Gatlin**, "Electrospray ionization of inorganic and organometallic complexes,"in *Electrospray Ionization Mass Spectrometry*; R. B. Cole, ed.; Wiley-Interscience: NY, **1997**; pp.527-570.

11. T. Vaisar, **C. L. Gatlin**, F. Turecek, "Metal-ligand redox reactions in gas-phase quaternary peptide-metal complexes by electrospray ionization mass spectrometry," *Int. J. Mass Spectrom. Ion Processes*, **1997**, *162*, 77-87.

10. **C. L. Gatlin**, R. Rao, F. Turecek, T. Vaisar, "Carboxylate and amine terminus directed fragmentations in gaseous dipeptide complexes with copper(II) and diimine ligands formed by electrospray," *Anal. Chem.* **1996**, *68*, 263-270.

9. T. Vaisar, **C. L. Gatlin**, F. Turecek, "Oxidation of peptide-copper complexes by alkali metal cations in the gas phase," *J. Am. Chem. Soc.*, **1996**, *118*, 5314-5315.

8. **C. L. Gatlin**, F. Turecek, "Ternary complexes of amino acids with late-transition metal cations and diimine ligands in the gas phase ," *J. Mass Spectrom.* **1995**, *30*, 1636-1637.

7. **C. L. Gatlin**, F. Turecek, T. Vaisar, "Gas-phase complexes of amino acids with Cu(II) and diimine ligands. Part I. Aliphatic and aromatic amino acids," *J. Mass Spectrom.* **1995**, *30*, 1605-1616.

6. **C. L. Gatlin**, F. Turecek, T. Vaisar, "Gas-phase complexes of amino acids with Cu(II) and diimine ligands. Part II. Amino acids with O, N and S functional groups in the side chain," *J. Mass Spectrom.* **1995**, *30*, 1617-1627.

5. **C. L. Gatlin**, F. Turecek, T. Vaisar, "Dinitrogen fixation by gas-phase copper(I) diimine complexes in electrospray," *J. Mass Spectrom.* **1995**, *30*, 775-777.

4. **C. L. Gatlin**, F. Turecek, T. Vaisar, "Cu(II) amino acids in the gas phase," *J. Am. Chem. Soc*, **1995**, *117*, 3637-3638.

3. **C. L. Gatlin**, F. Turecek, T. Vaisar, "Determination of soluable Cu(I) and Cu(II) species in jet juel by electrospray ionization mass spectrometry," *Anal. Chem.* **1994**, *66*, 3950-3958.

2. **C. L. Gatlin**, F. Turecek, "Acidity determination in droplets formed by electrospraying methanol-water solutions," *Anal. Chem.* **1994**, *66*, 712-718.

1. M. Cha, **C. L. Gatlin**, S. C. Critchlow, J. A. Kovacs, "Probing the influence of local coordination environment in ligand binding in nickel hydrogenase model complexes" *Inorg. Chem.*, **1993**, *32*, 5868-5876.

Selected Presentations

C. L. Bunai, P. R. Harris, C. D. Hopkins, C. Brittin, E. R. Tracy, W. E. Cooke, "Use of Room-Temperature Ionic Liquids (RTILs) for TOF-SIMS Analysis of Biomolecules", American Society of Mass Spectrometry Conference, Seattle, WA (2006), poster.

C. L. Bunai, D. Malyarenko, H. Chen, M. Tracy, E. Tracy, M. Sasinowski, R. Drake, L. Cazares, O. J. Semmes, M. Trosset, D. Manos, W. Cooke, "Automated Peak Picking and Alignment of TOF-MS Data for Biomarker Discovery and Early Cancer Diagnosis", 4th NCI Early Detection Research Network Scientific Workshop, Philadelphia, PA (2006), poster.

T. Gatlin, R. Pieper, S. Kuntumalla, S.-T. Huang, H. Alami, D. Clark, E. Gebregeorgis, P. Parmar, E. Mongodin, S. Gill, S. N. Peterson, "Identification and Quantitation of Cell Envelope-Associated Proteins from Vancomycin-Resistant Strains of *Staphylococcus aureus*", 7th International Symposium on Mass Spectrometry in the Health and Life Sciences: Molecular and Cellular Proteomics, San Francisco, CA (2005), poster.

T. Gatlin, NIH/NIAID sponsored 2-day Proteomics Workshop, The Institute for Genomic Research, Rockville MD (2005), coordinator/instructor.

T. Gatlin, "Profiling the cell surface proteins of *Staphylococcus aureus*", ThermoFinnigan Proteomics Seminar Series, Bethesda, MD; Toronto and Montreal, CAN (2005), invited speaker.

T. Gatlin, "Mass Spectrometry-Based Proteomics", Genome Sequencing and Analysis masters course at Johns Hopkins University, Rockville, MD (2004), lecturer.

T. Gatlin, "Mass Spectrometry Applications in Proteomics", The Institute for Genomic Research, Rockville, MD, (2003), speaker.

T. Gatlin, "Pharmacoproteomics to Profile Mechanism of Drug Action and Toxicity", IBC's 8th Annual Proteomics Conference, San Diego (2003), invited speaker.

T. Gatlin, "A Highly Automated Proteomics Facility for Drug Discovery and Development" Washington University, St. Louis, MO (2002), invited speaker.

T. Gatlin, "A Highly Automated Proteomics Facility: Merging 2D gel, Robotic Sample Prep, MS and Bioinformatics Technologies for Protein Identification and Characterization," National Cancer Institute, Frederick, MD (2002), invited speaker. (http://msig.ncifcrf.gov/msig-archives.html click on 2/12/02).

T. Gatlin, E. Field, C. Schatz, K. Kiersarsky, "Automated Capillary LC-MS/MS for Detection of Proteins from 2D-Gels," Eastern Analytical Symposium, Atlantic City, NJ (2001), invited speaker.

T. Gatlin, S. Steiner, "Pharmacoproteomics: to Profile Mechanisms of Efficacy and Toxicity," 15th Asilomar Conference on Mass Spectrometry, Pacific Grove, CA (1999), invited keynote speaker.

C. L. Gatlin, J. R. Yates, III "A novel interface for fritless sheathless LC-μspray and nanospray with an application for identification of hemoglobin variants by μLC-MSMS using SEQUEST,", 45th American Society of Mass Spectrometry Conference, Palm Springs, CA (1997), poster

C. L. Gatlin, F. Turecek, T. Vaisar, "Peptide coordination to copper(II)-diimines: structures and CAD mechanisms," 43rd American Society of Mass Spectrometry Conference, Atlanta, GA (1995), poster.

C. L. Gatlin, F. Turecek, "Acidity determination in microdroplets formed by electrospray," 42nd American Society of Mass Spectrometry Conference, Chicago, IL (1994), poster.

C. L. Gatlin, F. Turecek, D. B. Taylor, R. E. Synovec, "Determination of copper oxidation states in jet fuel by LC-ES/MS and extraction FIA-ES/MS," Center for Process Analytical Chemistry 20th Annual Sponsor Meeting, Bellevue, WA (1994), speaker.

C. L. Gatlin, M. Cha, S. C. Critchlow, J. A. Kovacs, "Mononuclear S, N-ligated nickel complexes as models for the active site of nickel hydrogenase," 204th American Chemical Society National Meeting, Washington, D.C. (1992), poster.

Grants

RO1 grant from NIH/NCI, "Enhancement of MS signal processing toward improved cancer biomarker discovery", 9/29/06-10/31/09
Role: co-PI

SBIR grant from NIH/NIAAA (RFA: AA-03-003), "Alcohol effects on brain protein expression profiles", June 2003.
Role: PI

NIH Review Panel Member

National Cancer Institute, Special Emphasis Panel, ZCA1 SRRB-C (O1), Proteomic Technology Assessment Resources, U24 grants, Silver Spring, MD (2006).

National Cancer Institute, Special Emphasis Panel, ZCA1- GRB-S (O1), Clinical Proteomic Technology Assessment for Cancer, PO1 grants, Silver Spring, MD (2006).

National Center for Research Resources, Center for Scientific Review Special Emphasis Panel, ZRG1 BCMB-D 30, Mass Spectrometer Systems, S10 grants, Washington, DC (2005).

National Institute of on Alcohol Abuse and Alcoholism, ZAA1 HH 67 P, RFA-AA-05-001 Center Application, P50 grant, Rockville, MD (2005).

National Institute of Diabetes and Digestive and Kidney Diseases, Special Emphasis Panel, ZDK1 GRB-1 M1, "Innovative Partnerships in Type 1 Diabetes Research", R01 grants, Bethesda, MD (2004).

National Institute of Allergy and Infectious Disease, Special Emphasis Panel, ZAI1 EC-M M1, "Biodefense and Emerging Infectious Disease Research Opportunities", P01 grants, Washington, DC (2003).