

## Curriculum Vitae

**Dr. Michal Kliman**

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### OBJECTIVE

I seek to apply my graduate training to the position of applications scientist in research and development in instrumental analysis. My graduate training focused on detailed ion mobility mass spectrometry (IM-MS) structural characterization of membrane lipids and cholesterol derivatives by tandem mass spectrometry (MS/MS) and computational modeling. I would like to fully utilize the analytical chemistry training, IM-MS, gas chromatography (GC), GC/MS and liquid chromatography (LC) experience in an industrial chemistry setting.

### EDUCATION

Instrumental Chemistry, Statistics

2006 – 2011

Vanderbilt University, Nashville, TN  
Ph.D. in Chemistry, August 2011, GPA: 3.9/4.0

1997 – 1999

Union University, Jackson, TN  
B.Sc. in Chemistry, Finance minor, May 1999, GPA: 4.0/4.0

1993 – 1997

University of Economics and Slovak Technical University, Bratislava, Slovakia  
Double Major: Applied Statistics and Chemistry, GPA: 3.6/4.0

### SCIENTIFIC SKILLS

Matrix Assisted Laser Desorption Ionization (MALDI) and Electrospray Ionization (ESI) Mass Spectrometry (MS), Ion Mobility MS, Imaging MS; Structural Computational Modeling

### RESEARCH

IM-MS Analysis of Lipids and Synthetic Polymers, Cell and Tissue Imaging MS, Laser Optics, Computational Modeling of Lipids, Oligonucleotides, Synthetic Polymers in Linux (Gaussian, Amber)

Dissertation Title:

Advanced Structural and Spatial Analysis of Lipids Using Ion Mobility-Mass Spectrometry

2007 – Present

Vanderbilt University, Nashville TN, Structural Mass Spectrometry Laboratory of Dr. John McLean and Natural Product Discovery Group of Dr. Brian Bachmann

IM-MS

Experienced user of both a research grade (Ionwerks, Inc.) drift tube ion mobility-mass spectrometer (IM-MS) and a commercial Synapt G2 (Waters, Inc.) traveling wave IM-MS with both MALDI and ESI ionization sources.

Imaging MS

Evaluated, acquired optical components for assembly, alignment, and testing of a patented laser optical train based on digital light patterning (DLP) technology. Experienced in tissue and cell monolayer imaging MS, traditional and new approaches to sample preparation and imaging substrates (metal, ITO, NIMS).

Structural Modeling

Set up computational modeling protocols for quantum mechanical and molecular dynamics based studies of conformers of lipids, oligonucleotides, and synthetic polymers in support of elucidation of biomolecular structural signatures based on experimental IM-MS collision cross-section (CCS) measurements.

October 28, 2011

- WORK EXPERIENCE** Postdoctoral Research Associate; Graduate Research Assistant; Laboratory Supervisor; Liquid, Gas Chromatography (LC, GC) Analytical Chemist
- 2011 – Present Vanderbilt University, Nashville, TN; Postdoctoral Research Associate, Structural Mass Spectrometry Laboratory of Dr. John A. McLean and Natural Product Discovery Laboratory of Dr. Brian O. Bachman
- structural, spatial, and computational analysis of lipids, peptides, and synthetic polymers using IM-MS, imaging mass spectrometry, and quantum mechanical and molecular dynamics calculations
  - graduate student research mentor, transferring computational modeling and imaging mass spectrometry projects to the next generation of graduate students
- 2006 – 2011 Vanderbilt University, Nashville, TN; Graduate Research Assistant, Structural Mass Spectrometry Laboratory of Dr. John A. McLean
- conducted research, publication and book chapter writing, presentations
  - experienced collaborator, all publications represent collaborative efforts
- 2005 – 2006 TEC Environmental Laboratories, Jackson, TN; Analytical Mass Spectrometrist
- performed analysis of volatile contaminants in drinking, production water, and soil samples by GC, GC/MS (Varian) instruments
  - trained at Varian company headquarters
  - oversaw out of box setup of GC-MS instrument for non-volatile analysis
- 2001 – 2005 Siegel-Robert Automotive, Inc., Ripley, TN; Chief Chemist
- oversaw 3 analytical chemists and 2 production personnel
  - responsible for both laboratory and production chemical ordering and inventory, with over \$100K monthly chemicals cash flow
  - oversaw standard analytical testing and development of new analytical protocols
  - scheduled weekly and monthly production maintenance, worked with production supervisors on maintenance implementation
  - worked closely with outside suppliers (Enthone, Atotech, Thermo-Fisher) on testing of new analytical methods and production processes
  - interacted closely with plant managers and production supervisors
  - voluntary leave with management support to pursue graduate school applications
- 1999 – 2001 Siegel-Robert Automotive, Inc., Ripley, TN; Analytical Chemist
- day shift chemist in a 24/7 automotive plating production facility
  - performed wet chemistry, UV-VIS, LC (Waters), SEM analyses of critical production components
  - promoted to Chief Chemist in 14 months

**PROFESSIONAL SKILLS** Procurement of Scientific and Industry Suppliers and Services, Laboratory Management Experience, Trustworthy, Team Player, Seasoned Collaborator, Focused Learner and Problem Solver

**TEACHING** Pre-lecture, Lab Supervision, Grading of Reports, and Lecture Exams, Office Hours, Tutoring

8/2010 – 12/2010 Undergraduate Research Mentor, McLean Laboratory

1/2010 – 5/2010 Teaching Assistant, Analytical Chemistry Laboratory

8/2006 – 12/2006 Teaching Assistant, General Chemistry Laboratory

## AWARDS AND HONORS

2011	Cover Image C&EN Tissue Lipid Imaging <a href="http://pubs.acs.org/cen/coverstory/89/8941aboutcover.html">http://pubs.acs.org/cen/coverstory/89/8941aboutcover.html</a>
2010	Student Poster Award Federation of Analytical Chemistry and Spectroscopy Societies (FACSS) Conference
2010	Cover Molecular Biosystems Drosophila Lipid Profiling <a href="http://pubs.rsc.org/en/content/articlelanding/2010/mb/b927494d">http://pubs.rsc.org/en/content/articlelanding/2010/mb/b927494d</a>
2010	VICB Student Award Finalist
2010	ACS Student Members Excellence in Teaching Award
2009	Vanderbilt Dissertation Enhancement Grant Travel grant to collaborate with the laboratory of Dr. J. Sabine Becker at the Research Center Juelich, Germany, on metal imaging MS projects.
1999	Union University Academic Medal

## PUBLICATIONS WITH CONTRIBUTION NOTES

6. **Kliman, M.**, May, J.C., McLean, J.A., 2011. Lipid Analysis and Lipidomics by Structurally Selective Ion Mobility-Mass Spectrometry, Invited contribution for inclusion in *Biochimica et Biophysica Acta – Molecular and Cell Biology of Lipids* Special Issue: Lipidomics and Imaging Mass Spectrometry, Robert C. Murphy & Alfred H. Merrill, Jr., guest eds., in press.

- introduction, review section on published lipid analyses by Ion Mobility-Mass Spectrometry (IM-MS)

5. Enders, J.R., **Kliman, M.**, Sundarapandian, S., McLean, J.A., 2010. Peptide and Protein Analysis using Ion Mobility-Mass Spectrometry, Wiley Books: Mass Spectrometry of Proteins and Peptides in Drug Discovery, Gross, M.L., Pramanik, B., Chen, G., eds., in press.

- section on computational approaches to gas phase structure elucidation of IM-MS measurements, editing of introduction and conclusion sections

4. **Kliman, M.**, Vijayakrishnan, N., Wang, L., Tapp, J.T., Broadie, K., McLean, J.A., 2010. Structural Mass Spectrometry Analysis of Lipid Changes in a Drosophila Epilepsy Model Brain, *Molecular BioSystems*, 6(6), pp. 958-966.

- data acquisition and preparation for statistical analysis, figures, introduction, results

3. Ridenour, W.B., **Kliman, M.**, McLean, J.A., Caprioli, R.M., 2010. Structural Characterization of Phospholipids and Peptides Directly from Tissue Sections by MALDI Traveling-Wave Ion Mobility-Mass Spectrometry, *Analytical Chemistry* 82(5), pp. 1881-1889.

- lipid collision cross-section (CCS) values, editing

2. Fenn, L.S., **Kliman, M.**, Mahsut, A., Zhao, S.R., McLean, J.A., 2009. Characterizing Ion Mobility-Mass Spectrometry Conformation Space for the Analysis of Complex Biological Samples, *Analytical and Bioanalytical Chemistry*, 394(1), pp. 235-244.

- IM-MS analysis of lipid standards, database of lipid CCSs, computational modeling of oligonucleotide isomers, preparation of figures, editing

1. Gies, A.P., **Kliman, M.**, McLean, J.A., Hercules, D.M., 2008. Characterization of Branching in Aramid Polymers Studied by MALDI-Ion Mobility/Mass Spectrometry. *Macromolecules*, 41(22), pp. 8299-8301.

- data acquisition, preparation of figures

## PUBLICATIONS IN PREPARATION WITH CONTRIBUTION NOTES

**Kliman, M.**, Woods, A.S., Schultz, J.A., Lybrand, T.P., Smith, J., McLean, J.A., 2011. Structural Selectivity of Anhydrous Sphingolipids and Glycerophospholipids.

- text, figures, IM-MS analysis of lipid standards, calculation of a database of lipid CCSs, statistical analysis, computational modeling of glycerophospholipids and sphingolipids

**Kliman, M.**, Korade, Z., Xu, L., McLean, J.A., Porter, N.A., 2011. Relative Quantitation and High Resolution Mass Spectrometry Imaging of Cholesterol and 7-Dehydrocholesterol Oxysterols in Smith-Lemli-Opitz Syndrome Mouse Model.

- text, figures, method development for cholesterol detection with sputtered silver nanoparticles, tissue sectioning, MS imaging experiments

**Kliman, M.**, Forsythe, J.G., Granger, A.P., McLean, J.A., 2011. Dynamic Light Patterning for High Spatial Resolution Imaging of Lipids.

- text, figures, assembly, alignment and optimization of a novel laser optical train

Forsythe, J.G., **Kliman, M.**, Lawrie, J.L., Broussard, J.A., Jiao, Y., Webb, D.J., Weiss, S.M., McLean, J.A., 2011. Semi-transparent Porous Silicon Films for Confocal and Mass Spectrometry Imaging of Cell Monolayers.

- MS imaging experiments, figures, editing

## SELECTED RESEARCH PRESENTATIONS AND POSTERS

10. **Kliman, M.**, Korade, M., Xu, L., McLean, J.A., Porter, N.A., 2010. Relative Quantitation and High Resolution Mass Spectrometry Imaging of Cholesterol and 7-Dehydrocholesterol Oxysterols in Smith-Lemli-Opitz Syndrome Mouse Model. In: *Vanderbilt Kennedy Center Science Day*, February 25, 2011, Nashville, TN, USA.

9. **Kliman, M.**, Forsythe, J.G., McLean, J.A., 2010. Ion Mobility Mass Spectrometry Structural Characterization and High Resolution Imaging and Profiling of Lipids. In: *Research Center Juelich, Laboratory of Dr. Sabine Becker*, November 15-19, 2010, Juelich, Germany.

8. **Kliman, M.**, Forsythe, J.G., McLean, J.A., 2010. Advances in Structural Characterization and High Resolution Profiling and Imaging of Lipid Species with Ion Mobility Mass Spectrometry. In: *The Federation of Analytical Chemistry and Spectroscopy Societies (FACSS) Conference*, October 24-29, 2010, Raleigh, NC, USA.

7. **Kliman, M.**, Enders, J.R., Goodwin, C.R., McLean, J.A., 2009. Dynamic Laser Patterning for Biomolecular Imaging MALDI – Mass Spectrometry. In: *The Federation of Analytical Chemistry and Spectroscopy Societies (FACSS) Conference*, October 18-22, 2009, Louisville, KY, USA.

6. **Kliman, M.**, Korade, M., Xu, L., McLean, J.A., Porter, N.A., 2009. Dynamic Laser Patterning for Biomolecular Imaging MALDI – Mass Spectrometry. In: *Vanderbilt Institute of Chemical Biology Summer Retreat*, August 8, 2009, Nashville, TN, USA.

5. **Kliman, M.**, Woods, A.S., Schultz, J.A., McLean, J.A., 2009. Fine Structure in Lipid Conformation Space: Study of Ion Mobility Mass Spectrometry Resolution of Sphingolipids and Glycerolipids. In: *American Society for Mass Spectrometry (ASMS) 21<sup>st</sup> Sanibel Conference on Mass Spectrometry*, January 23-26, 2009, St. Pete Beach, FL, USA.

4. Ridenour, W.B., **Kliman, M.**, McLean, J.A., Caprioli, R.M., 2009. Measurements of Lipid Collision Cross Sections Directly from Tissue Using Imaging MALDI Ion Mobility-MS. In: *American Society for Mass Spectrometry (ASMS) 21<sup>st</sup> Sanibel Conference on Mass Spectrometry*, January 23-26, 2009, St. Pete Beach, FL, USA.

3. **Kliman, M.**, Woods, A.S., Schultz, J.A., McLean, J.A., 2008. Structural Resolution of Sphingolipids and Glycerophospholipids by Ion Mobility Mass Spectrometry. In: *The Southeastern Regional Meeting of the American Chemical Society*, November 12-15, 2008, Nashville, TN, USA.

2. Fenn, L.S., **Kliman, M.**, Mahsut, A., Zhao, S.R., Kerr, T.J., Gant, R.L., McLean, J.A., 2008. Integrated 'Omics' Using Structural Mass Spectrometry Strategies. In: *The Southeastern Regional Meeting of the American Chemical Society*, November 12-15, 2008, Nashville, TN, USA.

1. Ugarov, M.V, Egan, T.F., Schultz, J.A., Fenn, L.S., **Kliman, M.**, McLean, J.A., Jackson, S.N., Wang, H.J., Woods, A.S., 2007. Study of Lipids in Tissues by Ion Mobility Time-Of-Flight Mass Spectrometry. In: *American Society for Mass Spectrometry (ASMS) Conference*, June 3-7, 2007, Indianapolis, IN, USA.

## **PROFESSIONAL AFFILIATIONS**

American Chemical Society Student and Postdoctoral Member

Society for Applied Spectroscopy Student and Postdoctoral Member

American Society for Mass Spectrometry Postdoctoral Member

## **VOLUNTEER WORK**

Graduate Student Reviewer for Vanderbilt Young Scientist Journal

Nashville Community Volunteer

Vanderbilt Graduate School Open Door Day Presenter

Undergraduate Student Tutor

American International Student Exchange Consultant

Local Chapter of American Chemical Society Student Representative at Large

## **HOBBIES**

Cycling, hiking, family trips