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## **Jianzhong Chen, Ph.D.**

Assistant Professor

School of Optometry, University of Alabama at Birmingham

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### **Appointments and Positions**

- 2014 – Present    Assistant Professor, School of Optometry, University of Alabama at Birmingham, Birmingham, AL  
Assistant Professor, Vision Science Research Center, University of Alabama at Birmingham, Birmingham, AL
- 2007 – 2014     Scientist, Air Force Research Laboratory, Dayton, OH (Contracted through Henry M. Jackson Foundation for the Advancement of Military Medicine, Rockville, MD)  
Visiting Scientist, The Ohio State University, Columbus, OH

### **Education and Training**

- 2006 – 2007     Postdoctoral, Analytical Chemistry, Washington State University, Pullman, WA  
Mentor: Professor James Bruce (moved to University of Washington in 2008)
- 2004 – 2006     Postdoctoral, Analytical Chemistry, University of Michigan, Ann Arbor, MI  
Mentors: Professor David Lubman (Department of Chemistry)  
Professor Diane Simone (Department of General Surgery)
- 1998 – 2003     Ph.D., Analytical Chemistry, University of Nebraska, Lincoln, NE  
Dissertation: “Chromatographic Studies of Drug-Protein Interactions”  
Mentor: Professor David Hage
- 1988 – 1993     B.S., Analytical Chemistry, University of Science & Technology of China, Anhui, China

### **Research Interest Keywords**

Dry eye disease, Tear film, Ocular surface, Lipidomics, Proteomics, Mass spectrometry, HPLC, Gas-phase fragmentation mechanism, Body fluids

### **Professional Services**

Ad hoc peer reviewer for:

- *Investigative Ophthalmology & Visual Science*

- *Optometry & Vision Science*
- *Eye & Contact Lens*
- *Journal of Proteome Research*
- *Biochimie*
- *Lipids*

### **Professional Memberships**

- American Society for Mass Spectrometry
- American Chemical Society
- The Association for Research in Vision and Ophthalmology

### **Awards and Honors**

- One paper highlighted in Nature Biotechnology: "[Finding time for allosteric interactions](#)," Nature Biotechnology, 2004
- Research Assistant Award, Department of Chemistry, University of Nebraska-Lincoln, 2003
- Kwang-hua Scholarship, University of Science & Technology of China, 1997

### **Grants**

- NEI R01EY026947 (PI: Nichols, JJ ) Direct Cost: \$1,250,000 9/1/2016-8/31/2021  
*The role of (O-acyl)-omega-hydroxy fatty acids in human lipid layer structure and function in health and meibomian gland dysfunction*  
Role: Co-Investigator (30% effort)
- NEI R01EY028581 (under revision)  
*Unique Molecular Composition of Tear Film Lipid Layer*  
Role: Principal investigator

### **Education on Grant Writing and Submission**

- NIH Review and Funding Process Workshop, 2016, American Society for Mass Spectrometry Conference
- NIH-CSR Workshop on the Review of Grant Applications, 2016, ARVO Conference
- NEI Grants Workshop: Preparing a Complete Application, 2015, ARVO Conference
- Proposal submissions, 2014, UAB Center for Clinical and Translational Science

### **Ph.D. Dissertation Committee**

- Eric Zhang (Chemical Engineering, Ph.D. advisor: Professor Ganjian Qin, Ph.D.), 2017-
- Shyam Panthi (School of Optometry, Ph.D. advisor: Professor Jason Nichols, O.D., Ph.D.), 2014-

- Stephanie Cox (School of Optometry, Ph.D. advisor: Professor Jason Nichols, O.D., Ph.D.), 2014-

### **Ph.D. Students Advising**

- Co-advise graduate student Shyam Panthi (Ph.D. advisor: Professor Jason Nichols, O.D., Ph.D.), 2014 -
- Co-advise graduate student Jillian Ziemanski, O.D., (Ph.D. advisor: Professor Kelly Nichols, O.D., Ph.D.), 2014 -

### **Teaching**

- Ocular Surface Journal Club, Fall, 2017
- 5<sup>th</sup> Annual Workshop on Metabolomics, hands-on training session - untargeted lipidomics, 2017
- Ocular Surface Journal Club, Spring, 2017
- Ocular Surface Journal Club, Fall, 2016
- 3<sup>rd</sup> Annual Workshop on Metabolomics, hands-on training session - untargeted lipidomics, 2015

### **Continuing Education on Teaching**

- Team-based learning -- a powerful alternative to lecture, 2014, UAB Center for Teaching & Learning
- Maximizing First Day of Class, 2014, UAB Center for Teaching & Learning
- Now that you will be teaching, what's next? 2014, UAB Center for Teaching & Learning

### **Service**

- Vision Science Graduate Program Admission Committee, 2017, UAB School of Optometry
- Ethics, Equity, and Diversity Committee, 2017, UAB School of Optometry
- UAB School of Optometry Marshall for UAB Commencement, 2017
- Member of Vision Science Graduate Program Admission Committee, 2016, UAB School of Optometry
- UAB School of Optometry Marshall for UAB Commencement, 2016

### **Publications (17 publications with 419 total citations, \*: Corresponding author)**

1. **JZ Chen\***, Keirse JK, KB Green, KK Nichols, “*Expression Profiling of Nonpolar Lipids in Meibum from Patients with Dry Eye: A Pilot Study*”, Invest. Ophthalmol. Vis. Sci., 2017, 58(4), 2266-2274
2. **JZ Chen\***, KB Green, KK Nichols, “*Compositional analysis of wax esters in human meibomian gland secretions by direct infusion electrospray ionization mass spectrometry*”, Lipids, 2016, 51(11), 1269-1287 [**1 citation**]

3. **JZ Chen\***, KB Green, KK Nichols, “*Characterization of wax esters by electrospray ionization tandem mass spectrometry: Double bond effect and unusual product ions*”, *Lipids*, 2015, 50(8), 821-836. [3 citations]
4. **JZ Chen\***, KB Green, KK Nichols, “*Quantitative profiling of major neutral lipid classes in human meibum by direct infusion electrospray ionization mass spectrometry*”, *Invest. Ophthalmol. Vis. Sci.*, 2013, 54(8), 5730-5753. [14 citations]
5. **JZ Chen\***, P Shiyarov, JJ Schlager, KB Green, “*A pseudo MS<sup>3</sup> approach for identification of disulfide-bonded proteins: Uncommon product ions and database search*”, *J. Am. Soc. Mass Spectrom.*, 2012, 23(2), 225-243. [9 citations]
6. **JZ Chen**, KB Green-Church, KK Nichols, “*Author response: On the presence of (O-acyl)- $\omega$ -hydroxy fatty acids and their esters in human meibomian gland secretions*”, *Invest. Ophthalmol. Vis. Sci.*, 2011, 52(3), 1894-1895. [3 citations]
7. **JZ Chen**, KB Green-Church, KK Nichols, “*Author response: On the presence and role of polar lipids in meibum*”, *Invest. Ophthalmol. Vis. Sci.*, 2010, 51(12), 6910-6911. [2 citations]
8. **JZ Chen**, KB Green-Church, KK Nichols, “*Shotgun lipidomic analysis of human meibomian gland secretions with electrospray ionization tandem mass spectrometry*”, *Invest. Ophthalmol. Vis. Sci.*, 2010, 51(12), 6220-6231. [71 citations]
9. **JZ Chen\***, P Shiyarov, LW Zhang, JJ Schlager, KB Green-Church, “*Top-down characterization of a native highly intra-linked protein: concurrent cleavages of disulfide and protein backbone bonds*”, *Anal. Chem.*, 2010, 82(14), 6079-6089. [17 citations]
10. **JZ Chen**, JE Schiel, DS Hage, “*Noncompetitive peak decay analysis of drug–protein dissociation by high-performance affinity chromatography*”, *J. Sep. Sci.*, 2009, 32(10), 1632-1641. [28 citations]
11. **JZ Chen**, M Anderson, DE Misek, DM Simeone, DM Lubman, “*Characterization of apolipoprotein and apolipoprotein precursors in pancreatic cancer serum samples via two-dimensional liquid chromatography and mass spectrometry*”, *J. Chromatogr. A.*, 2007, 1162(2), 117-125. [47 citations]
12. **JZ Chen**, DS Hage, “*Quantitative studies of allosteric effects by biointeraction chromatography: Analysis of protein binding for low-solubility drugs*”, *Anal. Chem.*, 2006, 78(8), 2672-2683. [31 citations]
13. **JZ Chen**, I Fitos, DS Hage, “*Chromatographic analysis of allosteric effects between ibuprofen and benzodiazepines on human serum albumin*”, *Chirality*, 2006, 18(1), 24-36. [21 citations]
14. DS Hage, **JZ Chen** “*Quantitative affinity chromatography: Practical applications*”, In: *Handbook of Affinity Chromatography*, D.S. Hage, ed., CRC Press, July, 2005. [2 citations]
15. **JZ Chen**, C Ohnmacht, DS Hage, “*Studies of phenytoin binding to human serum albumin by high performance affinity chromatography*”, *J. Chromatogr. B.*, 2004, 809(1), 137-145. [76 citations]
16. **JZ Chen**, DS Hage, “*Quantitative studies of allosteric drug-protein binding by biointeraction chromatography*”, *Nat. Biotech.*, 2004, 22(11), 1445-1448. [75 citations]
17. **JZ Chen**, C Ohnmacht, DS Hage, “*Characterization of drug binding to soluble beta-cyclodextrin using immobilized human serum albumin columns*”, *J. Chromatogr. A.*, 2004, 1033(1), 115-126. [18 citations]

## Manuscripts to be submitted

1. **JZ Chen\***, KK Nichols, “*MS/MS<sup>all</sup> Analysis of Lipids in Meibum Samples*”
2. **JZ Chen\***, JB Keirse, KB Green, KK Nichols, “*Differentially Expressed Lipids in Meibum from Patients with Dry Eye Disease: Analysis by High-Resolution Mass Spectrometry*”
3. **JZ Chen\***, P Shiyonov, JJ Schlager, KB Green, “*Top-down MS/MS and pseudo MS<sup>3</sup> analysis for phosphoprotein identification and characterization: 1. Positive ion mode*”
4. **JZ Chen\***, P Shiyonov, JJ Schlager, KB Green, “*Top-down MS/MS and pseudo MS<sup>3</sup> analysis for phosphoprotein identification and characterization: 2. Negative ion mode*”

## Abstracts and Presentations

1. J Meadows, **JZ Chen**, KK Nichols, “*Evaluation of trypsin-free collection techniques to optimize lipidomic analysis of immortalized human meibomian gland epithelial cells in culture*”, The American Academy of Optometry’s 95<sup>th</sup> Annual Meeting, Oct., 2017, Chicago, IA (**Oral**)
2. **JZ Chen**, KK Nichols, “*Characterizing human meibum by shotgun lipidomics, MS/MS<sup>all</sup> and successive polarity switching*”, 65<sup>th</sup> ASMS Conference on Mass Spectrometry, June, 2017, Indianapolis, IN
3. **JZ Chen**, KK Nichols, “*Chain length and saturation levels of molecular species of neutral lipids in dry eye patients*”, ARVO 2017, May 2017, Baltimore, MD
4. J Meadows, **JZ Chen**, KB Green, JJ Nichols, KK Nichols, “*Relation between dietary fat intake and meibum lipids*”, The American Academy of Optometry’s 95<sup>th</sup> Annual Meeting, Nov., 2016, Anaheim, CA
5. **JZ Chen**, KK Nichols, “*Compositional analysis of  $\omega$ -hydroxy fatty acid-based diesters in human meibum*”, TFOS 2016, September, 2016, Montpellier, France
6. J Meadows, **JZ Chen**, KB Green, JJ Nichols, KK Nichols, “*Toward an understanding of the roles of meibum lipids and dietary fat in dry eye diseases*”, The 8th International Conference on the Tear Film & Ocular Surface: Basic Science and Clinical Relevance, September, 2016, Montpellier, France
7. **JZ Chen**, KB Green, KK Nichols, “*Differentially expressed nonpolar lipids in meibum of dry eye: Post-menopausal women vs. contact lens-wearers*”, 64<sup>th</sup> ASMS Conference on Mass Spectrometry, June, 2016, San Antonio, TX
8. **JZ Chen**, KK Nichols, “*Composition of diesters in human meibum*”, ARVO 2016, June, 2016, Seattle, WA
9. J Meadows, **JZ Chen**, K Dionne, KK Nichols, “*Identification of lipid species produced by differentiated immortalized human meibomian gland epithelial cells*”, ARVO 2016, May, 2016, Seattle, WA
10. S Panthi, **JZ Chen**, L Wilson, JJ Nichols, “*Evaluation of extraction and mass spectrometry methods for detection of possible lipid mediators of inflammation in tears*”, ARVO 2016, May, 2016, Seattle, WA

11. **JZ Chen**, KK Nichols, “*Shotgun lipidomic analysis of human meibum by MS/MS<sup>all</sup> with successive switching between positive and negative detection modes*”, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Mar., 2016, Atlanta, GA (Oral)
12. J Meadows, **JZ Chen**, K Basso, K Nichols, “*Differential expression of lipid species in human meibum across dry eye subgroups*”, The American Academy of Optometry’s 94<sup>th</sup> Annual Meeting, Oct., 2015, New Orleans, LA
13. **JZ Chen**, KB Green, KK Nichols, “*Label-free quantification of isomeric wax esters by direct infusion ESI MS/MS: a study of human meibomian gland secretions*”, 63rd ASMS Conference on Mass Spectrometry, May, 2015, Saint Louis, MS
14. **JZ Chen**, J Keirse, KB Green, KK Nichols, “*Differentially expressed non-polar lipids in human meibum of dry eye disease*”, ARVO 2015, May, 2015, Denver, CO
15. CK Postnikoff, **JZ Chen**, J Keirse, KB Green, KK Nichols, “*Altered regulation of expressed polar meibum lipids in dry eye disease*”, ARVO 2015, May, 2015, Denver, CO
16. **JZ Chen**, “*Major lipid species in human meibomian gland secretions: identification and quantification by mass spectrometry*”, University of Alabama at Birmingham Vision Science Research Center Seminar, Oct. 2014, Birmingham, AL (Oral)
17. **JZ Chen**, Basso KB, Nichols KK, “*Absolute quantification of major neutral lipid species in human meibum by direct infusion ESI-MS*”, 11th Annual Ohio Valley Mass Spectrometry Symposium, Apr., 2014, Columbus, OH (Oral)
18. KK Nichols, **JZ Chen**, KB Green, “*Identification of lipid biomarkers for dry eye disease in post-menopausal women using shot-gun electrospray mass spectrometry*”, 7th International Conference on the Tear Film & Ocular Surface: Basic Science and Clinical Relevance, Sept., 2013, Taormina, Sicily, Italy
19. M Apasega, **JZ Chen**, KK Nichols, JJ Nichols, KB Green, “*Identification of lipid biomarkers for dry eye disease in post-menopausal women using shotgun electrospray mass spectrometry*”, 61st ASMS Conference on Mass Spectrometry, June, 2013, Minneapolis, MN
20. KB Green, **JZ Chen**, M Apasega, KK Nichols, JJ Nichols, “*Identification of lipid biomarkers for dry eye disease in post-menopausal women using shotgun electrospray mass spectrometry*”, Metabolomics Seminar, August, 2012, Columbus, OH
21. **JZ Chen**, P Shiyonov, LW Zhang, JJ Schlager, KB Green, “*Identification and characterization of phosphorylated proteins by combined top-down MS/MS and MS<sup>3</sup> analysis*”, 60th ASMS Conference on Mass Spectrometry, May, 2012, Vancouver, CA
22. KK Nichols, **JZ Chen**, M Apasega, JJ Nichols, KB Green, “*Identification of lipid biomarkers for dry eye disease in post-menopausal women using shotgun electrospray mass spectrometry*”, ARVO 2012, May, 2012, Fort Lauderdale, FL
23. **JZ Chen**, KB Green, KK Nichols, “*Double bond effect on collision-induced dissociation of wax esters in electrospray ionization mass spectrometry analysis*”, Pittsburgh Conference 2012, March, 2012, Orlando, FL

24. **JZ Chen**, P Shiyarov, JJ Schlager, KB Green-Church, “*Pseudo MS<sup>3</sup> analysis of protein precursor ions in absence of mobile protons via electrospray ionization and quadrupole time-of-flight mass spectrometry*”, 59th ASMS Conference on Mass Spectrometry, June, 2011, Denver, CO
25. **JZ Chen**, KB Green-Church, KK Nichols, “*Sensitive detection of nonpolar lipids in human meibomian gland secretions via shotgun electrospray ionization-mass spectrometry*”, LIPID MAPS Annual Meeting 2011: Lipidomics Impact on Cell Biology, Cancer, and Metabolic Diseases, May, 2011, San Diego, CA
26. **JZ Chen**, P Shiyarov, JJ Schlager, KB Green-Church, “*Pseudo MS<sup>3</sup> analysis of a native disulfide-bonded protein via ESI-Q-TOF mass spectrometry: formation of uncommon types of product ions*”, 8th Annual Ohio Valley Mass Spectrometry Symposium, Apr., 2011, Columbus, OH (Oral)
27. **JZ Chen**, P Shiyarov, JJ Schlager, KB Green-Church, “*Top-down pseudo MS<sup>3</sup> analysis of a native disulfide-bonded protein: fragmentation characteristics in absence of mobile protons and application for protein identification via database search*”, 23rd ASMS Sanibel Conference on Mass Spectrometry, Jan., 2011, St. Petersburg Beach, FL
28. **JZ Chen**, KB Green-Church, KK Nichols, “*Sodium iodide as an additive for sensitive ESI-MS analysis of neutral lipids in human meibomian gland secretions*”, 14th ASMS Asilomar Conference on Mass Spectrometry, Oct., 2010, Pacific Grove, CA
29. **JZ Chen**, LW Zhang, P Shiyarov, JJ Schlager, KB Green-Church, “*Top-down characterization of a native highly intra-linked protein: concurrent cleavages of disulfide and protein backbone bonds*”, 58th ASMS Conference on Mass Spectrometry, May, 2010, Salt Lake City, UT
30. **JZ Chen**, LW Zhang, P Shiyarov, JJ Schlager, KB Green-Church, “*Top-down characterization of a 14 kDa protein highly knotted with four disulfide bonds*”, 7th Annual Ohio Valley Mass Spectrometry Symposium, Apr., 2010, Columbus, OH (Oral)
31. **JZ Chen**, KB Green-Church, KK Nichols, “*MS and MS/MS analysis of human meibum lipids with electrospray ionization*”, 36th FACSS Conference, Oct., 2009, Louisville, KY
32. **JZ Chen**, RL Pitsch, NJ DelRaso, KB Green-Church, JJ Schlager, P Shiyarov, “*Exploring biomarkers in rat urine for  $\alpha$ -naphthylisothiocyanate induced cholestasis*”, 57th ASMS Conference on Mass Spectrometry, May, 2009, Philadelphia, PA
33. KB Green-Church, **JZ Chen**, KK Nichols, “*Identification of individual lipid components in human meibomian gland secretions with high resolution mass spectrometry*”, ARVO 2009 Annual Meeting, May, 2009, Fort Lauderdale, FL
34. **JZ Chen**, KB Green-Church, KK Nichols, “*Lipidomic analysis of human meibomian gland secretions with electrospray ionization mass spectrometry*”, 6th Annual Ohio Valley Mass Spectrometry Symposium, Apr., 2009, Columbus, OH (Oral)
35. **JZ Chen**, KB Green-Church, KK Nichols, “*Identification of components of major lipid classes in human meibomian gland secretions with electrospray ionization mass*

- spectrometry analysis*”, 21st ASMS Sanibel Conference on Mass Spectrometry, Jan., 2009, St. Petersburg Beach, FL
36. **JZ Chen**, NK Kaiser, Y Carella, H Huff, JE Bruce, “*Top-down analysis of modifications on cysteine 34 of albumin in human serum samples*”, 56th ASMS Conference on Mass Spectrometry, June, 2008, Denver, CO (Oral)
  37. **JZ Chen**, GR Munske, XT Tang, NK Kaiser, Y Carella, H Huff, JE Bruce, “*Identification of cysteine 34 amino acid modifications on albumin in human serum samples*”, 55th ASMS Conference on Mass Spectrometry, June, 2007, Indianapolis, IN
  38. **JZ Chen**, DS Hage, “*Quantitative analysis of allosteric effects in biological systems: a new approach based on high-performance affinity*”, 30th International Symposium on High Performance Liquid Phase Separations and Related Techniques, June, 2006, San Francisco, CA (Oral)
  39. **JZ Chen**, DM Simeone, DM Lubman, “*Serum protein profiling for detection of pancreatic cancer*”, 54th ASMS Conference on Mass Spectrometry, May, 2006, Seattle, WA
  40. **JZ Chen**, DM Simeone, DM Lubman, “*Exploring serum biomarkers for pancreatic cancer by prefractionation, 2D-LC separation and mass spectrometry identification*”, 53rd ASMS Conference on Mass Spectrometry, June, 2005, San Antonio, TX
  41. DS Hage, **JZ Chen**, “*Quantitative studies of allosteric drug-protein interactions by high performance affinity chromatography: development and evaluation of a new universal model*”, 28th International Symposium on High Performance Liquid Phase Separations and Related Techniques, June, 2004, Philadelphia, PA
  42. **JZ Chen**, DS Hage, “*Studies of allosteric interactions and drug-protein binding by high-performance affinity chromatography: a new universal model*”, 14th International Symposium on Pharmaceutical and Biomedical Analysis, Sept., 2003, Orlando, FL (Oral)
  43. **JZ Chen**, DS Hage, “*Development of a new approach for the determination of solution phase binding constants by affinity chromatography: studies of drug binding to soluble beta-cyclodextrin on an immobilized HSA column*”, Nebraska Academy of Sciences, Apr., 2003, Lincoln, NE (Oral)
  44. **JZ Chen**, C Ohnmacht, DS Hage, “*Studies of phenytoin binding to human serum albumin by high performance affinity chromatography*”, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Mar., 2003, Orlando, Florida
  45. **JZ Chen**, C Ohnmacht, DS Hage, “*Studies of phenytoin binding to human serum albumin by high performance affinity chromatography*”, 37th Midwest Regional American Chemical Society Meeting, Oct., 2002, Lawrence, KS (Oral)
  46. **JZ Chen**, C Ohnmacht, DS Hage, “*Examination of phenytoin binding to human serum albumin by high performance affinity chromatography*”, 26th International Symposium on High Performance Liquid Phase Separations and Related Techniques, June, 2002, Montreal, Canada
  47. **JZ Chen**, C Ohnmacht, DS Hage, “*Studies of phenytoin binding to human serum albumin by high performance affinity chromatography*”, 36th Midwest Regional American Chemical Society Meeting, Oct., 2001, Lincoln, NE
  48. DS Hage, **JZ Chen**, “*Determination of protein-drug dissociation rates by the peak-decay method*”, 14th International Symposium on Affinity Interactions, Apr., 2001, San Carlos, Sonora, Mexico