

# KAVEH JORABCHI

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## EDUCATION

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- Aug. 2006**    **Ph.D. in Chemistry (Analytical)**, The George Washington University, Washington, DC 20052;  
Research Advisor: Professor Akbar Montaser  
Cumulative GPA: 4.0/4.0
- Jan. 2001**    **B.Sc. in Chemistry**, Sharif University of Technology, Tehran, Iran  
Cumulative GPA: 18.55/20 (3.71/4.0)  
GRE Chemistry Score: 950 (98%)
- May 1997**    **High school diploma**, National Organization for Development of Exceptional Talents, Tabriz, Iran  
Cumulative GPA: 19.5/20

## RESEARCH EXPERIENCE

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- June 2006-Present**    **Postdoctoral Research Associate**, University of Wisconsin, Madison, WI  
Research Mentor: Professor Lloyd M. Smith
- Developed charge assisted laser desorption/ionization which produces gas-phase ions from droplets and electrically isolated samples
  - Designed instrumentation and demonstrated the first application of a levitated droplet as a true contactless sample handling method and ion source for mass spectrometry
  - Developed instrumentation and chemistries for atmospheric-pressure ion-molecule reactions that simplify ESI mass spectra
  - Performed bottom-up proteomics analyses for collaborative projects with on-campus biological researchers
  - Developed microchip based capillary electrophoresis-ESI charge reduction mass spectrometry to characterize the proteins of a single red blood cell
- Jan. 2001-May 2006**    **Graduate Research Assistant**, The George Washington University, Washington DC 20052; Research Advisor: Professor Akbar Montaser
- Conducted aerosol measurements using laser based imaging techniques that resulted in fundamental understanding of plasma-droplet interactions, leading to more efficient sample introduction methods for ICPMS/ICP-AES
  - Designed new coil geometries for He ICPMS which reduce the secondary discharge to the MS sampling orifice and lower the ion kinetic energies by 85%, improving sensitivity and resolution
  - Developed a  $\mu$ -flow liquid sample introduction method for coupling a  $\mu$ -flow LC to chemical reaction interface mass spectrometry to measure carbon isotope ratios of proteins and peptides
  - Designed and constructed a laminar-flow electrospray interface for nano-flow liquid sample introduction in ICPMS
  - Performed method development and validation for trace elemental analysis of drugs using microwave digestion and ICP-AES/ICPMS
- Jan. 2000-Jan. 2001**    **Undergraduate Research Assistant**, Sharif University of Technology, Tehran, Iran, Research Advisor: Professor Mehdi Jalali Heravi
- Modeling and predicting the redox potential of organic compounds in non-aqueous solvents.

## TEACHING EXPERIENCE

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**Sept. 2001-May 2002 Graduate Teaching Assistant:** The George Washington University, Washington,

**Sept. 2003-May 2004** DC 20052

- **Instructor:** physical chemistry and general chemistry labs
- **Tutor:** organic chemistry, physical chemistry, and analytical chemistry courses

**Sept. 2000-Jan. 2001 Undergraduate Teaching Assistant,** Sharif University of Technology

- **Instructor:** Inorganic chemistry labs

**Jun. 1998-Sept. 2000 Instructor and Recruiting Committee Member,** Iranian National Olympiad Center, Tehran, Iran

- **Instructor:** Advanced organic chemistry for national top 40 senior high school students participating in National Chemistry Olympiad
- **Instructor:** Inorganic lab for National Chemistry Olympiad team members
- **Examiner:** Design of the theoretical and practical exams for recruitment of National Chemistry Olympiad team members

## PUBLICATIONS

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1. M. S. Westphall, **K. Jorabchi**, and L. M. Smith, Mass spectrometry of acoustically levitated droplets, *Anal. Chem.* 80, 5847-5853 (2008)
2. **K. Jorabchi**, M. S. Westphall, and L. M. Smith, Charge assisted laser desorption/ionization mass spectrometry of droplets, *J. Am. Soc. Mass Spectrom.* 19, 833-840 (2008)
3. **K. Jorabchi**, R. McCormick, J. A. Levin, H. Liu, S. Nam, and A. Montaser, Investigation of high efficiency nebulizer for helium inductively coupled plasma-mass spectrometry, *Spectrochim. Acta* 61 B, 945-950 (2006)
4. **K. Jorabchi**, R. G. Brennan, J. A. Levine, and A. Montaser, Interferometric droplet imaging for insitu droplet characterization in an inductively coupled plasma, *J. Anal. Atom. Spectrom.* 21, 839 - 846 (2006); **cover page article**
5. K. Kahen, **K. Jorabchi**, and A. Montaser, Desolvation induced non-linearity for Br determination using ultrasonic nebulization, *J. Anal. Atom. Spectrom.* 21, 588-591 (2006)
6. **K. Jorabchi**, K. Kahen, P. Lecchi, and A. Montaser, Chemical reaction interface mass spectrometry with high efficiency nebulization, *Anal. Chem.* 77, 5402-5406 (2005)
7. **K. Jorabchi**, K. Kahen, C. Gray, and A. Montaser, In-situ visualization and characterization of the aerosol droplets in an inductively coupled plasma, *Anal. Chem.* 77, 1252-1260 (2005)
8. K. Kahen, **K. Jorabchi**, C. Gray, and A. Montaser, Spatial mapping of droplet velocity and size in direct and indirect nebulization, *Anal. Chem.* 76, 7194-7201 (2004)
9. **K. Jorabchi**, and A. Montaser, New coil geometries for the study of secondary discharge in atmospheric-pressure helium inductively coupled plasma mass spectrometry, *Spectrochimica Acta* 59 B, 1471-1479 (2004)
10. S.E. O'Brien, J. R. Chirinos, **K. Jorabchi**, K. Kahen, M. E. Cree, and A. Montaser, Investigation of the direct injection high efficiency nebulizer for axially and radially viewed inductively coupled plasma atomic emission spectrometry, *J. Anal. Atom. Spectrom.* 18, 910-916 (2003)

## SELECTED PRESENTATIONS

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1. **K. Jorabchi**, M. S. Westphall, and L. M. Smith, In situ mass spectrometry of levitated droplets using charge assisted laser desorption/ionization, Poster presentation at 56<sup>th</sup> American society for mass spectrometry conference, Denver, CO, 06/2008
2. **K. Jorabchi**, M. S. Westphall, B. L. Frey, M. Scalf, and L. M. Smith, Mass spectrometric protein profiling of a single cell, Poster presentation at 2007 Pittsburgh Conference, Chicago, IL, 2/2007
3. M. Taghioskoui, **K. Jorabchi**, M. Zaghlul, and A. Montaser, Microplasma chips for chemical analysis, Poster presentation at 33<sup>rd</sup> annual meeting of Federation of Analytical Chemistry and Spectroscopic Societies, Lake Buena Vista, FL, 09/2006
4. **K. Jorabchi**, R. G. Brennan, J. A. Levine, and A. Montaser, Status of aerosol generation and transport in inductively coupled plasma spectrometries, Invited lecture at Winter Conference on Plasma Spectrochemistry, Tucson, AZ, 01/2006

5. **K. Jorabchi**, R. G. Brennan, D. E. Mittelberger, and A. Montaser, Electrospray interface for nanoflow liquid sample introduction in inductively coupled plasma mass spectrometry, Poster presentation at 230<sup>th</sup> American Chemical Society National Meeting, Washington, DC 08/2005
6. **K. Jorabchi**, R. McCormick, J. A. Levine, H. Liu, S. Nam, and A. Montaser, High efficiency nebulization and aerosol desolvation in helium inductively coupled plasma mass spectrometry, Presentation at Pittsburgh Conference, Orlando, FL, 03/2005
7. K. Kahen, **K. Jorabchi**, C. Gray, and A. Montaser, Spatial mapping of droplet velocity and size in direct and indirect nebulization, Invited lecture to 31<sup>st</sup> annual meeting of Federation of Analytical Chemistry and Spectroscopic Societies, Portland, OR, 10/2004
8. **K. Jorabchi**, K. Kahen, P. Lecchi, and A. Montaser, An improved interface for liquid sample introduction in chemical reaction interface mass spectrometry, Invited poster presentation to 31<sup>st</sup> annual meeting of Federation of Analytical Chemistry and Spectroscopic Societies, Portland, OR, 10/2004
9. **K. Jorabchi**, K. Kahen, C. Gray, and A. Montaser, In-situ visualization and characterization of the aerosol droplets in an inductively coupled plasma, Invited lecture to 31<sup>st</sup> annual meeting of Federation of Analytical Chemistry and Spectroscopic Societies, Portland, OR, 10/2004
10. A. Montaser, K. Kahen, **K. Jorabchi**, C. Gray, and J. A. Levine, Fundamental nebulization processes and analyte transport in high-temperature plasmas, Invited lecture to IVC-16/ICSS- 12/NANO-8, Venice, Italy 06/2004
11. **K. Jorabchi**, K. Kahen, C. Gray, J. A. Levine, and A. Montaser, Two-dimensional droplet size and velocity mapping of nebulizer aerosol in high-temperature analytical plasmas, ILASS Americas, 17<sup>th</sup> Annual Conference on Liquid Atomization and Spray Systems, Arlington, VA, 05/2004
12. K. Kahen, **K. Jorabchi**, C. Gray, J. Levine and A. Montaser, Direct droplet imaging for aerosol characterization in inductively coupled plasmas, Presentation at International Winter Conference on Plasma Spectroscopy, Fort Lauderdale, FL, 01/2004
13. **K. Jorabchi**, M. Hwang and A. Montaser, Effects of sample introduction system on secondary discharge and temperatures in helium inductively coupled plasma mass spectrometry, Invited lecture to 30<sup>th</sup> annual meeting of Federation of Analytical Chemistry and Spectroscopic Societies, Fort Lauderdale, FL, 10/2003
14. J. R. Chirinos, K. Kahen, B. W. Acon, S. E. O'Brien, **K. Jorabchi**, and A. Montaser, Investigation of the direct injection high efficiency nebulizer in axial and radial inductively coupled plasma atomic emission spectrometry, 29<sup>th</sup> Annual Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, Detroit, MI, 10/2002

## **PATENTS**

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1. A. Montaser, **K. Jorabchi**, K. Kahen, In-situ droplet monitoring for self-tuning spectrometers (Patent filed 10/2004)
2. A. Montaser, K. Kahen, **K. Jorabchi**, A feedback mechanism for smart nozzles and nebulizers (Patent filed 10/2004)

## **AWARDS AND HONORS**

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- NIH Genomic Science Training Program Postdoctoral Fellow, 2008-2010
- Cover page article in J. Anal. Atom. Spectrom. issue 9 (September), 2006
- 2006 Chorafas Foundation Prize for exceptional achievements in research
- Society for Applied Spectroscopy's 2005 Graduate Student Award in recognition of outstanding research in the field of spectroscopy
- American Chemical Society-Division of Analytical Chemistry Graduate Fellowship, 06-08/2005
- Society for Applied Spectroscopy's Best Student Poster Award at 31<sup>st</sup> annual meeting of Federation of Analytical Chemistry and Spectroscopic Societies, Portland, OR, 10/2004
- Invited lecturer and travel award to the 31<sup>st</sup> annual meeting of Federation of Analytical Chemistry and Spectroscopic Societies, Portland, OR, 10/2004
- Best Poster Award at International Winter Conference on Plasma Spectrochemistry, Fort Lauderdale, FL, 01/2004
- Invited lecturer and travel award to the 30<sup>th</sup> annual meeting of Federation of Analytical Chemistry and Spectroscopic Societies, Fort Lauderdale, FL, 10/2003
- Top student of graduating class, Sharif University of Technology, Tehran, Iran, 01/2001

- Silver medal of International Chemistry Olympiad, Montreal, Canada, 07/1997
- Gold medal of National Chemistry Olympiad, Tehran, Iran, 09/1996

## **INSTRUMENTATION AND PROGRAMMING SKILLS**

- Organic and inorganic mass spectrometry (ESI, MALDI, APCI, DART, CALDI, ICP, MIP, and GD ion sources; TOF, ion trap, triple and single quad analyzers)
- Instrument design and hyphenation of techniques.
- Elemental spectroscopy using plasmas and flames; UV and IR absorption spectroscopy
- Separations (CE, HPLC, and GC)
- Particle and droplet characterization (IPI, PIV, PTV, and PDPA)
- Programming with MATLAB, LabView, Pascal, and C++, simulations with Simion software
- Machining and glassblowing

## **COLLABORATIONS**

- University of North Carolina, Department of Chemistry, Professor J. Michael Ramsey
- Medical College of Wisconsin, Biotechnology and bioengineering center, Professor Andrew Greene
- Varian Inc., Walnut Creek, CA; Dr. Michelle Cree
- Centro de Quimica Analitica, Universidad Central de Venezuela, Caracas, Venezuela, Professor Jose Ramon Chirinos
- Institute for Proteomics Technology and Applications and Department of Pharmacology, The George Washington University School of Medicine; Dr. Paolo Lecchi
- LaVSION Inc., Ypsilanti, MI, Dr. Callum Gray

## **LANGUAGES**

- English: Fluent
- Azerbaijani: Native
- Farsi (Persian): Native

## **AFFILIATIONS**

- Member, American Society for Mass Spectrometry, Jan. 2008-present
- Member, American Chemical Society, March 2001-present

## **EXTRACURRICULAR ACTIVITIES**

Music is of a great interest to me and I have been presenting Persian classical music for more than 15 years. My expertise is in kamancheh, a spike fiddle. I have collaborated with many National and International music ensembles over the years. Selected list of most recent concerts:

- Invited performance and workshop of Persian classical music with Haft-Ahang ensemble, Music Department, Boise State University, Boise, ID, Nov. 2002
- Invited performance with Haft-Ahang ensemble at World Arts Festival, Music Department, Montgomery College, Rockville, MD, Feb. 2004
- Persian classical music performance in collaboration with US Army Band, Fort Myer Army Base, Arlington, VA, Nov. 2004
- Persian classical music concert, University of Maryland, College Park, MD, May 2006

Administrative Experience:

- Assistant project manager in "Music for Life" project; A fundraiser musical event in support of research in Multiple Sclerosis disease, The George Washington University, Jun 2005-Jan. 2006
- Science Olympiad judge, Longfellow Middle School, Fairfax, VA, Jan. 2006