Curriculum Vitae
Kristin S Dooley

UCA Department of Chemistry
Laney-Manion Hall Room 205
201 Donaghey Avenue
Conway, AR 72035

Most Recent Position

- **Assistant Professor**, Department of Chemistry
  University of Central Arkansas, Conway, Arkansas
  August 2012-Present

Education

- **Ph.D. in Physical Chemistry**
  Department of Chemistry, *Texas A&M University, College Station, Texas*,
  - Graduated May **2009** (GPA: 4.0/4.0)
  - Dissertation Title: Velocity Map Ion Imaging: Applications in understanding halogen oxide photochemistry (Advisor: Prof. S. W. North)

- **Bachelor of Science in Chemistry and Applied Mathematics**
  Minor: Honors Interdisciplinary Studies
  University of Central Arkansas, Conway, Arkansas
  - Graduated May **2004** with magna cum laude honors

Teaching Experience

Fall 2010-Spring 2012 **Visiting Assistant Professor**
Univ. of Central Arkansas, Conway, AR
Taught various general chemistry courses including: College Chemistry I and II, Fundamentals of Chemistry, and General Chemistry for non-majors. Served as a faculty co-advisor for the UCA student ACS chapter.

June 2007-June 2008	**GK-12 Fellow** *Texas A&M, College Station, TX* Enriched the science instruction of 5th grade students by working alongside classroom teachers to develop and implement activities and teaching methods to enhance the science classroom.
Spring 2007	**Teaching Assistant** *Texas A&M, College Station, TX* Instructed undergraduate laboratories in physical chemistry.
Fall 2006	**Experiment Development** *Texas A&M, College Station, TX* Assisted in developing and setting up new laboratory experiments for the physical chemistry laboratory.
Spring 2006	**Teaching Assistant** *Texas A&M, College Station, TX* Instructed undergraduate laboratories in physical chemistry for chemistry majors.
Fall 2004 – Spring 2005	**Teaching Assistant** *Texas A&M, College Station, TX* Instructed undergraduate laboratories in an introductory level chemistry course for prospective engineering majors.

Research Experience

Assistant Professor (August 2012-Present)
University of Central Arkansas, Conway, AR

- Cavity Ring-Down Spectroscopy (CRDS) is an ultrasensitive absorption technique that is used extensively in environmental measurements where its sensitivity is exploited. My research focuses on the measurement of optical properties of aerosols which depend on the size, shape, and composition of the particles, and dictate the warming or cooling effects on our climate.

Postdoc Research Associate (June 2009-July 2010)
Arkansas State University, State University, AR
Supervisor: Professor Susan Davis Allen

- Laser Induced Breakdown Spectroscopy (LIBS) is enhanced with the use of an IR laser. Work included characterizing the mechanism of this enhancement. A possible application of this research is the stand-off detection of explosive residues on motor vehicles as they pass a checkpoint.
- The use of UV LEDs and titanium dioxide is studied for its use in photocatalytic destruction of biological agents, specifically the anthrax-like spores , *B. Subtillus*. A possible application is found in military and medical facility air filtration systems.

Graduate Research Assistant (May 2005 – May 2009)
Texas A&M, College Station, TX
Advisor: Professor Simon W. North

- Halogen oxide radical species (XO) are studied in a molecular beam using the Velocity Map Ion Imaging (VELMI) technique. Radical species are made in situ using various solenoid pulsed valve assemblies. Recent work has focused on:
  - The Bond Dissociation Energy (BDE) measurement of IO and BrO, which are thermochemical quantities that are needed for accurate atmospheric modeling.
  - The study of the photodissociation dynamics of ClO and BrO, which provide insight into the strengths and limitations of current quantum calculations.

Undergraduate Research Assistant (May 2002 - May 2004)
University of Central Arkansas, Conway, AR
Advisor: Professor William S. Taylor

- Reactions of metal ions with various CFC species were studied using a drift cell technique in a quadrapole mass spectrometer. Positive metal ions produced with a glow discharge source were directed into a drift cell charged with 3-4 torr He and a small partial pressure of the neutral CFC species. The goals of this project were to:
  - Understand the mechanisms of the reactions of CFC species with metal ions.
  - Determine bimolecular rate constants for these reactions.

Affiliations

- American Chemical Society
- Arkansas Academy of Science
- Phi Lambda Upsilon (Chemical Honor Society)
  - Secretary 2007-2008

Honors and Awards

- First Place Session Winner and Chemical Sciences Taxonomy First Place Winner for Outstanding Oral Presentation (Student Research Week, Texas A & M University, 2009)
- Environmental Health and Safety Department Recognition for Oral Presentation (Student Research Week, Texas A & M University, 2009)
- Senator Phil Gramm Doctoral Fellowship (Texas A & M University, 2008)
- NSF GK-12 Fellowship (Texas A & M University, 2007)
- Welch Foundation Scholarship (Texas A & M University, 2004)
- College of Natural Sciences and Mathematics Most Outstanding Student (May 2004, University of Central Arkansas)

- Undergraduate Research Grant for Education (University of Central Arkansas Honors College, 2002)
- National Merit Finalist Scholarship (University of Central Arkansas, 1999)
- Arkansas Academic Challenge Scholarship (University of Central Arkansas, 1999)

Professional Outreach and Service

- 2013-Present
  Super Saturday Instructor
  During a Super-Saturday event, I lead a 4-hour review session to help high school students prepare for the AP Chemistry exam. These occur 2-3 times per academic year.

- Summer 2014 and 2015
  College of Natural Science and Mathematics Bootcamp Instructor
  In this role, I introduced incoming freshmen chemistry majors to lectures, exams, and techniques to avoid common pitfalls of college students.

- February 2012-March 2014
  Judging Coordinator, Arkansas State Science Fair, Conway, Arkansas
  I served for three years in the role of recruiting highly qualified judges for the fair and organizing scoring packets.

- August 2011-Present
  Co-Advisor, UCA American Chemical Society Student Chapter
  As Co-Advisor, I spent several hours per week with the students planning and organizing outreach activities as well as other chapter activities.

Presentations

Dooley, Kristin S., DeYoung, Jessica, *"Comparison of effective optical properties of two-component internally mixed aerosols using various mixing rules"*, Oral Presentation, The Arkansas Academy of Science 102nd Annual Meeting, (April, 2018). Arkansas State University, Jonesboro, AR.

Dooley, Kristin S., DeYoung, Jessica, *"Determination of Two-Component Aerosol Optical Properties using Various Approximation Methods"*, Oral Presentation, Arkansas Space Grant Consortium Annual Symposium, (April, 2018). Winthrop Rockefeller Institute Morrilton, AR.

Dooley Kristin S., DeYoung, Jessica, *"Comparison of effective optical properties of internally mixed aerosols computed using various mixing rules"* Poster Presentation, American Chemical Society National Meeting and Exposition, (April 2018). New Orleans, LA.
*Poster chosen for Sci-Mix Session

Dooley Kristin S., *"Updating a classic: Using absorption spectroscopy of diatomic molecules to highlight the similarities and differences of diatomic potential energy curves"*, Oral Presentation, American Chemical Society National Meeting and Exposition, (April 2018). New Orleans, LA.

Dooley, Kristin S., *"Comparison of Various Mean Field Formulations for Retrieving Refractive Indices of Aerosol Particles Containing Inclusions"*, Poster Presentation, 12th International Meeting on Laser-Light and Interactions with Particles (LIP), (March 2018). Texas A&M University, College Station, TX.

Dooley, Kristin S., North, W. Simon, *"Characterizing the interaction of light with atmospherically important species using velocity map ion imaging and cavity ring-down spectroscopy",* Invited Research Seminar, UCA Society of Physics Students, (April 2013), UCA, Conway, AR.

Dooley, Kristin S., North, Simon W., *"Photodissociation Dynamics of Halogen Oxide Species"* Invited Research Seminar, Hendrix College Seminar Series (September 24, 2012) Hendrix College, Conway, AR.

Kristin S. Dooley, Justine N. Geidosch, and Simon W. North, *"Direct Measurement of the Bond Dissociation Energy of IO Using Velocity Map Ion Imaging"*, Oral Presentation, Student Research Week (March 2009), Texas A&M, College Station, TX.
**Award of First Place in Division*

Kristin S. Dooley, Justine N. Geidosch, Hahkjoon Kim, Gerrit C. Groenenboom, and Simon W. North, *"Vibrational state-dependent predissociation dynamics of ClO ($A\,^2\Pi_{3/2}$): Insight from final correlated state branching ratios"*, Poster Presentation, 235th National ACS Meeting (April 2008), New Orleans, LA.

Kristin S. Dooley, Justine N. Geidosch, Hahkjoon Kim, Gerrit C. Groenenboom, and Simon W. North, "*Vibrational state-dependent predissociation dynamics of ClO ($A\,^2\Pi_{3/2}$): Insight from the final correlated state branching ratios,"* Poster Presentation, Dynamics of Molecular Collisions XXI Conference (July 2007), Santa Fe, NM.

Kristin S. Dooley, Justine N. Geidosch, Hahkjoon Kim, Gerrit C. Groenenboom, and Simon W. North, "*Vibrational state-dependent predissociation dynamics of ClO ($A\,^2\Pi_{3/2}$): Insight from the final correlated state branching ratios,"* Poster Presentation, Industry-University Cooperative Chemistry Program (IUCCP), (October 2007) Texas A&M University, College Station, TX.

Publications

Dooley, Kristin S. and DeYoung Jessica, "Comparison of various mean field formulations for retrieving refractive indices of aerosol particles containing inclusions" *Journal of the Arkansas Academy of* Science, 72 (2018), **In Press**.

Grubb, Michael P.; **Dooley, Kristin S.**; Freeman, C. Daniel; Peterson, Kirk A.; North, Simon W., "Experimental and theoretical investigation of correlated fine structure branching ratios arising from state-selected predissociation of BrO ($A^2\Pi_{3/2}$)"**,** *Physical Chemistry Chemical Physics*, , 16, 607-615 (2014).

Province, Dennis W.; O'Neil, Shannon; Higgins, Keri; Smith, Paul J.; **Dooley, Kristin**; Curtis, Joey; Grippo, Adam M.; Rino, John W.; Allen, Susan D., "Disinfection of B. subtilis cells in suspension using ultraviolet light emitting diodes (LEDs) in the presence of TiO_2", *AIP Conference Proceedings: Biology, Nanotechnology, Toxicology, and Applications, 1326*, 170-176 (2011).

Erin E. Greenwald, Buddhadeb Ghosh, Katie C. Anderson, **Kristin S. Dooley**, Peng Zou, Tabitha Selby, David L. Osborn, Giovanni Meloni, Craig A. Taatjes, Fabien Goulay, Stephen R. Leone, and Simon W. North, "Isomer-Selective Study of the OH-Initiated Oxidation of Isoprene in the Presence of O_2 and NO: The Minor OH-Addition Channel" *Journal of Physical Chemistry A*, 114, 904 (2010).

Kristin S. Dooley, Michael P. Grubb, Justine N. Geidosch, Marloes van Beek, Gerrit C. Groenenboom, and Simon W. North "Correlated Fine structure Branching Ratios Arising from State-Selected Predissociation of ClO ($A\ ^2\Pi_{3/2}$)" *Physical Chemistry Chemical Physics*,11, 4754 (2009).

Kristin S. Dooley, Justine N. Geidosch, and Simon W. North "Ion Imaging Study of IO Radical Photodissociation" *Chemical Physics Letters*, 457, 4, (2008).

Hahkjoon Kim, **Kristin S. Dooley**, Simon W. North, Gregory E. Hall, and Paul L. Houston "Anisotropy of Photofragment Recoil as a Function of Dissociation Lifetime, Excitation Frequency, Rotational Level and Rotational Constant" *Journal of Chemical Physics* 125, 133316 (2006).

Hahkjoon Kim, **Kristin S. Dooley**, Gerrit C. Groenenboom, and Simon W. North "Vibrational Sate Dependent Predissociation Dynamics of ClO ($A\ ^2\Pi_{3/2}$): Insight from Correlated Fine Structure Branching Ratios" *Physical Chemistry Chemical Physics* 8, 2964 (2006).

Hahkjoon Kim, **Kristin S. Dooley**, Elizabeth R. Johnson, and Simon W. North, "Photodissociation of the BrO Radical using Velocity Map Ion Imaging : Excited State Dynamics and Accurate D0(Br-O) Evaluation " *Journal of Chemical Physics* 124, 134304 (2006).

Hahkjoon Kim, **Kristin S. Dooley**, Elizabeth R. Johnson, and Simon W. North, "Design and Characterization of a Late-Mixing Flash Pyrolytic Source for Expansion Cooled Radicals " *Review of Scientific Instruments* 76, 124101 (2005).

W.S. Taylor, C.C Matthews, **K.S. Parkhill**, "Reactions of $Cu^+(^1S,^3D)$ with CH_3Cl, CH_2ClF, $CHClF_2$, and $CClF_3$" *J. Phys. Chem. A, 109*, 356 (2005).

Funding Proposals

"Probing the Atmospheric Structure of Terrestrial Exoplanets and Exploring the Degeneracies Therein: Using the Atmospheric Structure of Intrasolar Planets as Calibrators," 2018, Arkansas NASA EPSCoR Research Infrastructure Grant, Co-I: K.S. Dooley (Total Budget: $25,000 Sub-Award: $9,200, Submitted)

"Probing the Atmospheric Structure of Terrestrial Exoplanets and Exploring the Degeneracies Therein: Using the Atmospheric Structure of Intrasolar Planets as Calibrators," 2018, NASA EPSCoR, Co-I: K.S. Dooley (Total Budget: $644,790 Sub-Award: $217,000, Not Funded)

"Determination of multi-component aerosol optical properties", 2017-2018, Arkansas Space Grant Consortium, Research Infrastructure Grant, ($14,900.00, Funded)

"Exploring the Differences Between Experimental and Theoretical Determination of the Optical Extinction and Scattering Properties of Aerosols" 2017, UCA University Research Council Summer Stipend ($3,000, Funded)

"Building a Labview Interface for a Cavity Ring-down Spectrometer Capable of Measuring the Optical Extinction Properties of Aerosol Particles" 2016, UCA University Research Council Summer Stipend ($3,000, Funded)

"Measuring the Optical Extinction Properties of Aerosol Particles of Various Compositions Using a Cavity Ringdown Spectrometer" 2015, UCA, University Research Council Research Award ($7,100, Funded)

"Demo Palooza: A Celebration of Chemistry" 2014, ACS Student Inter-Chapter Relations Grant ($880, Funded)