

Department of Atmospheric Science

Academic Year 2014-2015



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College of Engineering and Applied Science

Department Head Notes

Welcome to the 2014 Academic Year! These past few months have been a time of significant change at the University of Wyoming. Dr. Al Rodi, who has served as Department Head of our group for the past 15 years, was appointed Dean of the College of Engineering and Applied Science on July 1. I then took over as Head. We wish Al the best of luck with his new position. To help Dean Rodi with new College Engineering Initiatives, Dr. Bart Geerts has accepted the position of Associate Dean of the College.

We face challenges with the retirement of Dr. Montague this December. Derek has been with us for many years and his tireless efforts with our undergraduate courses in atmospheric science and engineering will be difficult to replace. I will miss his wisdom at faculty and committee meetings. We also said goodbye to Susan Allen this fall. I will always owe Susan. She drafted my Antarctic streamline map thirty years ago – a real work of art that has been reproduced in various forms since its publication in *Nature*. We also welcome some new faces. Nicole Lawrence and Charlotte While are helping Rimvyda with all the important administrative duties that make our department go!

As always, we are excited at the new crop of graduate students. This year's class of 10 is one of the larger incoming groups we have seen in recent years. We continue to explore the college's Engineering Initiative, goals of which are to expand the college budget and add additional faculty positions during the next 5 year period. In particular, we are excited at the possible development of the new "research cluster" in the area of water resources. Our recent faculty additions in areas of cloud microphysics, aerosols and climate will no doubt enhance our research efforts in this area.

The King Air research aircraft remains at the heart of our operation. Our 7th cooperative agreement between UW and NSF for operation of the King Air, Wyoming Cloud Radar and Wyoming Cloud Lidar systems as National Facilities in the NSF Lower Atmospheric Observing Facility program is underway. A new challenge in the next few years will be to secure funding for a replacement for the King Air, which is nearing the end of its useful life many years of service. The plan is for Dr. Rodi to step back into our department after his tenure in the Dean's Office to pursue our next research aircraft.

This booklet is intended to help newcomers (as well old-timers) become familiar with all our personnel. Good luck to all of you in your studies and research. If you have any questions do not hesitate to see me or any of the departmental faculty or staff.

Tom Parish Department Head

Faculty

Jeff French,

Assistant Professor Ph.D., University of Wyoming, Atmospheric Science, 1996

Bart Geerts

Professor, Associate Dean Ph.D., University of Washington, Atmospheric Science, 1990





Robert Kelly Professor Ph.D., University of Chicago, Geophysical Sciences, 1982

Xiaohong Liu Professor Wyoming Excellence Chair in Climate Science Ph.D., Nanjing University, China, Atmospheric Science, 1992





Derek Montague Associate Professor Ph.D., University of Southampton, U.K., Physical Chemistry, 1967

> Shane Murphy Assistant Professor Ph.D., California Institute of Technology, Chemical Engineering, 2009







Thomas Parish

Professor Ph.D., University of Wisconsin, Meteorology, 1980

Alfred Rodi

Dean, College of Engineering and Applied Sciences Professor Ph.D., University of Wyoming, Atmospheric Science, 1981





Jefferson Snider Professor Ph.D., University of Wyoming, Atmospheric Science, 1989

> Zhien Wang Professor Templeton Faculty Fellow Ph.D., University of Utah, Meteorology, 2000





Faculty Emeritus

John Marwitz

Professor Emeritus Ph.D., McGill University, Meteorology, 1971

> Gabor Vali Professor Emeritus Ph.D., McGill University, Physics, 1968





Terry Deshler Professor Emeritus Ph.D., University of Wyoming, Physics, 1982

Academic Professionals



Matthew Burkhart Research Scientist

Min Deng, Ph.D. Senior Research Scientist





Robert Field, Ph.D. Senior Research Scientist

Sam Haimov, Ph.D. Senior Research Scientist





David Leon, Ph.D. Senior Research Scientist

Larry Oolman, Ph.D. Senior Research Scientist



Academic Professionals



Jeffrey Soltis Associate Research Scientist

Perry Wechsler Senior Research Scientist Chief Engineer



Post Doctoral Associates



Zheng Lu, Ph.D. Post Doctoral Research Associate Working with Xiaohong Liu







David Plummer, Ph.D. Post Doctoral Research Associate Working with Jeff French/Dave Leon

Xianming Sun, Ph.D. Post Doctoral Research Associate Working with Zhien Wang



Post Docs

Yonggang Wang, Ph.D. Post Doctoral Research Associate Working with Bart Geerts

> Damao Zhang, Ph.D. Post Doctoral Research Associate Working with Zhien Wang



Staff



Thomas Drew Research Pilot



Brent Glover Master Technician

Jason Green Aircraft Maintenance Technician





Staff



Ben Heesen Technician





Nicole Lawrence Accountant

Daryl Lippincott First Officer





Zane Little Technician

> Nick Mahon Senior Engineer





Edward Sigel First Officer

> Stan Smith Senior Engineer



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Staff

Brett Spiker Chief Aircraft Mechanic





Brett Wadsworth **Chief Research Pilot** Safety Officer

> Jim Waldram **Executive Computer Support** Specialist





Charlotte While Office Associate Graduate Student Coordinator Flight Scheduler

Graduate Students



Eric Beamesderfer

Ephrata, PA California University of Pennsylvania, B.S. Advisor: Shane Murphy Class: Fall 2012 Degree: M.S. Project: Optical Properties of Aerosol Particles

Philip Bergmaier Sadsburyville, PA Millersville University, B.S. University of Wyoming, M.S. Advisor: Bart Geerts Class: Fall 2012 Degree: Ph.D. Project: Lake-effect snow band dynamics





Xia Chu

Taiyuan, China Nanjing University of Information Science and Technology, B.S. University of Wyoming, M.S. Advisor: Bart Geerts Class: Fall 2013 Degree: Ph.D. Project: Agl Seeding of Clouds Impact Investigation (ASCII)

Rachel Edie Colorado Springs, CO University of Colorado, B.S. Advisor: Shane Murphy Class: Fall 2013 Degree: M.S. Project: Regional air quality in the Upper Green River Basin in Wyoming



Graduate Students

Katherine Foster



Santa Barbara, CA University of California, San Diego, B.S. University of Wyoming, M.S. Advisor: Shane Murphy / Terry Deshler Class: Fall 2013 Degree: Ph.D.; Project: Development of Balloonborne Optical Particle Counter

Sara Fults Sanborn, MN St. Cloud State University, B.S. Advisor: Jeff Snider Class: Fall 2012 Degree: M.S. Project: Aerosol impact of coastal orographic precipitation in Chile





Thomas Hafer California University of Pennsylvania, B.S. Advisor: Bart Geerts Class: Fall 2014 Degree: M.S. Project: Agl Seeding of Clouds Impact Investigation (ASCII)

Xiaoqin Jing Shanxi, China Nanjing University of Information Science and Technology, B.S. Advisor: Bart Geerts Class: Fall 2012 Degree: M.S. Project: Doppler on Wheels (DOW) Radar in ASCII



Graduate Students



Timothy Juliano

Newtown, PA Millersville University, B.S. Advisor: Robert Kelly/ Bill Lindberg Class: Fall 2013 Degree: M.S. Project: Analyzing surface layer stability in the Laramie Valley

Sujan Khanal Kathmandu, Nepal University of Wyoming, M.S. Advisor: Zhien Wang/ Jeff French Class: Fall 2010 Degree: Ph.D. Project: Wyoming KA Integrated Cloud Observations





Dana Mueller

Fort Collins, CO University of Oklahoma, B.S. Advisor: Bart Geerts Class: Fall 2014 Degree: M.S. Project: PECAN, Investigation of bores using UW King Air Lidar

Rebecca Pauly New Tripoli, PA Millersville University, B.S. Advisor: Zhien Wang Class: Fall 2013 Degree: M.S. Project: Multi-function Airborne Roman Lidar Development and Data Analysis



Graduate Students



Binod Pokharel

Kathmandu, Bagmati, Nepal Tribhuvan University, B.S. University of Wyoming, M.S. Advisor: Bart Geerts Class: Fall 2011 Degree: Ph.D. Project: Agl Seeding of Clouds Impact Investigation (ASCII)

Rudra Pokhrel Damak, Nepal Tribhuvan University, B.S. Advisor: Shane Murphy Class: Fall 2012 Degree: M.S. Project: Optical properties of aerosol particles





Anna Robertson

Ham Lake, MN South Dakota School of Mines, B.S. Advisor: Shane Murphy Class : Fall 2014, M.S. Project: Methane emissions from the oil and natural gas fields in the Denver-Julesberg Basin.

Dustin Snare Dillsburg, PA California University of Pennsylvania, B.S. Advisor: Shane Murphy Class: Fall 2012 Degree: M.S. Project: Emissions from Oil and Gas Extraction



Graduate Students



Sharon Sullivan

Albuquerque, NM University of New Mexico, B.S. Advisor: : Tom Parish Class: Fall 2014 Degree: M.S. Project: PECAN, Observational and numerical studies of the Great Plains low-level jet

Chicago, IL University of Illinois at Chicago, B.S. & M.S. Advisor: Jeff French/ David Leon Class: Fall 2013 Degree: M.S. Project: Convective Precipitation Experiment Microphysics and Entrainment Dependencies (COPE-MED)





Adam Tripp

Denver, Colorado Metropolitan State University, B.S. Advisor: Robert Kelly Class: Fall 2014 Degree: M.S. Project: Numerical simulations of the Wyoming wind energy resource

Daniel Welsh Fort Collins, CO University of Northern Colorado, B.S. Advisor: Bart Geerts/ Sam Haimov Class: Fall 2013 Degree: M.S. Project: Ontario Winter Lake-effect Systems (OWLeS)



Graduate Students



Jing Yang

Wuxi, China Nanjing University of Information Science and Technology, B.S. Advisor: Zhien Wang Class: Fall 2012 Degree: Ph.D. Project: Observe and model ice in mixed-phase clouds

Mingxuan Wu Wuxi, China Nanjing University of Information Science and Technology, B.S. Advisor: Xiaohong Liu Class: Fall 2012 Degree: Ph.D. Project: Implementation of convective microphysics in climate models





Yun Zhou

Guangxi, China Wuhan University, B.S., Wuhan University, M.S. Advisor: Xiaohong Liu Class: Fall 2014 Degree: M.S. Project: Aerosol particle formation

Student Learning Outcomes

http://www.uwyo.edu/atsc/expectations/learningoutcomes.html

M.S. degree: The M.S. program prepares students for supporting scientific research in governmental, academic, or private laboratories, teaching at the secondary or community college level, or private consulting. M.S. students will have demonstrated:

- a) a broad working knowledge of the atmospheric sciences encompassed by the core curriculum.
- b) analytical and mathematical skills necessary to develop insight into physical processes in the atmosphere
- c) familiarity with the literature in the area of the research thesis.
- d) ability to analyze and synthesize data (observations and/or modeling) necessary in the thesis research.
- e) ability to carry out directed research.
- f) ability to communicate research results in the form of written reports, visual displays, and scientific presentations.
- **Ph.D. Degree:** The Ph.D. degree is awarded upon attainment of independent

scholarship in atmospheric science. The Ph.D. program prepares students for carrying out independent research in governmental, academic, or private laboratories, and for teaching at the community college, 4-year college, or university level. Ph.D. students will have demonstrated:

- a) skills and abilities sufficient to satisfy the MS degree requirements.
- b) deep understanding of the literature in the dissertation area.
- c) ability to independently identify relevant scientific problems in the dissertation specialty area.
- d) ability to design methods for observation and experimentation, and evaluate the results of such research.
- e) ability to communicate research results in peer-reviewed journals, and present effective seminar to both on- and off-campus colleagues.
- f) ability to plan course syllabi, and present well-organized and effective

Website Resources

- WyoWeb: https://wyoweb.uwyo.edu/cp/home/displaylogin
- UWYO Email: https://uwmail.uwyo.edu/
- Admissions: http://www.uwyo.edu/admissions/
- International Students and Scholars: http://www.uwyo.edu/iss/
- Multicultural Affairs: http://www.uwyo.edu/oma/
- Campus Safety: http://www.uwyo.edu/uw/campus-safety/
- Student Medical Insurance: http://www.uwyo.edu/administration/ operations/risk-management/student-medical-insurance.html

Excerpts from the Graduate Bulletin

http://www.uwyo.edu/registrar/university_catalog/grad_students.html

- Graduate students must maintain a 3.0 GPA to remain in good academic standing, and to keep their stipend and tuition & fee benefit.
- Graduate stipends in our department are MS \$1,516/month and PhD \$1,856/month. After meeting specific requirements, the MS stipend increases to \$1,668/month and PhD to \$2,042/month. The department pays all tuition and mandatory fees including the College of Engineering and Applied Science's fees, and the student health insurance premium for those students receiving a full stipend and tuition package.
- In the early part of the second semester, the student and their faculty advisor work on forming the student's graduate committee, which is then approved by both the department head and college dean. The committee functions to guide the student in coursework selection, the degree project construction, and degree completion requirements. The functional and contractual document for the individual student's degree is the Program of Study, which should also be completed in the second semester, and constitutes an agreement between the student, the student's committee, and the university.
- MS students must complete 28 hours of required coursework and also complete a minimum of 4 hours of thesis research (ATSC5960), have an approved research plan by the graduate committee (at the end of year one) present a colloquium and oral defense of their MS thesis, and complete an approved thesis.
- PhD students must have 72 semester hours of credit at the 4000 level or above from UW or equivalent levels from another approved university. This 72-hour requirement may include graduate credits earned while working toward the master's degree in the same area, but at least 42 hours (of the 72) must be earned in formal coursework which includes the required courses listed and a minimum of 14 hours in elective courses approved by the major advisor and/or committee.
- Additional credits toward the 72-hour requirement may include additional formal course credits, 5980 Dissertation Research, or 5990 Internship. PhD students also have to pass a qualifying assessment exam, have a research plan approved by the graduate committee, present at least one colloquium per year, pass a preliminary exam (at least 15 weeks before dissertation defense), present an oral defense of their dissertation, and complete an approved dissertation.

Important Information

Required Courses:

http://www.uwyo.edu/atsc/academics/coursework/index.html

(These courses are required for both master's and doctoral programs.):

ATSC 5001. Atmospheric Energetics. 2.

ATSC 5002. Atmospheric Radiation. 3.

ATSC 5003. Problems in Energetics and Radiation. 1.

ATSC 5004. Problems in Dynamic Meteorology. 1.

ATSC 5005. Microphysics. 2.

ATSC 5006. Problems in Microphysics. 1.

ATSC 5007. Problems in Synoptic Meteorology. 1.

ATSC 5008. Mesoscale Meteorology. 2.

ATSC 5020. Physical Meteorology Lab. 1.

ATSC 5100. Atmospheric Dynamics I. 3.

ATSC 5160. Synoptic Meteorology. 2.

ATSC 5210. Cloud and Precipitation Systems. 3.

ATSC 5880. Ethics and Research Methods. 1.

UW Elective(s) to be determined by committee. 3 minimum

ATSC Elective(s). To be determined by committee. 3 minimum

Who to contact:

- Financial & Policy Information: Rimvyda Valiukenas (rimvyda@uwyo.edu)
- Graduate Student Coordinator (http://www.uwyo.edu/atsc/howtoapply/): Charlotte While (cfoster6@uwyo.edu)
- Seminar Schedule (http://www.uwyo.edu/atsc/seminars/): Jeff Snider (jsnider@uwyo.edu)
- Department Computers (http://www.uwyo.edu/atsc/quicklinks/ computers.html) : Jim Waldram (jwaldram@uwyo.edu) or Larry Oolman (Idoolman@uwyo.edu)
- Office of the Registrar (http://www.uwyo.edu/registrar/): Calendar and deadlines, graduate student regulations and policies, forms and petitions, transcripts and enrollment, registration, class schedules, and final exam schedules.
- Student Financial Aid (http://www.uwyo.edu/sfa/): Scholarships and loan information, and tuition and fee payments.
- Dean of Students (http://www.uwyo.edu/dos/): Code of Conduct and campus safety
- Graduate Education (http://www.uwyo.edu/uwgrad/enrolled-students/): Developing a Program of Study, forms, peti-

Faculty, AP and Staff Directory

NAME	OFFICE PHONE (307)	ROOM (EN)	EMAIL All @uwyo.edu
Burkhart, Matthew	766-4150	6066	monoski
Deng, Min	766-6334	6022	mdeng2
Deshler, Terry	766-2006	6038	deshler
Drew, Tom	742-2435	Flight Center	tkdrew
Field, Robert	766-2180	6079	rfield1
French, Jeff	766-4143	6065	jfrench
Geerts, Bart	766-2261	6062	geerts
Glover, Brent	766-3200	6074D	bglover
Green, Jason	742-2435	Flight Center	jgreen34
Haimov, Samuel	766-2726	6018	haimov
Heesen, Ben	766-4346	6002	bheesen
Kelly, Robert	766-4955	6072	rkelly
Kuestner, William	742-6440	Flight Center	kuestner
Leon, David	766-3268	6071	leon
Lippincott Daryl	742-2435	Flight Center	dlippinc
Little, Zane	766-2990	6078B	Zlittle1
Liu, Xiaohong	766-3225	6050	xliu6
Luo, Tao		6041	tluo
Lu, Zhen		6041	zlu2
Mahon, Nick	766-4899	6074E	nmahon
Marwitz, John			jmarwitz
Montague, Derek	766-4949	6024	montague
Murphy, Shane	766-6408	6030	Smurph19
Oolman, Larry	766-2665	6016	Idoolman
Parish, Thomas	766-5153	6025	parish
Plummer, David		6040	dplumme1
Rodi, Alfred	766-4945	6034A	rodi
Sigel, Edward	742-2435	Flight Center	esigel
Smith, Stan	766-2968	6078A	rytas
Snider, Jefferson	766-2637	6019	jsnider
Soltis, Jeffrey	766-2158	6014	jsoltis
Spiker, Brett	742-2435	Flight Center	bspiker
Vali, Gabor		6059	vali
Valiukenas, Rimvyda	766-3246	6029	Rimvyda

Faculty, AP and Staff Directory

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Wadsworth, Brett	742-2435	Flight Center	bwadswo1
Waldram, Jim	766-5351	6020	jwaldram
Wang, Yonggong		6040	wyg
Wang, Zhien	766-5356	6071	zwang
Wechsler, Perry	766-4956	6068	wex
While, Charlotte	766-5352	6034	
Zhang, Damao		6041	dzhang4

Student Directory

NAME	ROOM (EN)	EMAIL
Beamesderfer Eric	6051	ebeamesd@uwyo.edu
Bergmaier, Philip	6048	pbergmai@uwyo.edu
Chu, Xia	6046	Xchu1@uwyo.edu
Edie, Rachel	6049	redie@uwyo.edu
Foster, Katherine	6049	Kfoste14@uwyo.edu
Fults, Sara	6042	sfults@uwyo.edu
Hafer, Thomas	6051	thafer@uwyo.edu
Jing, Xiaoqin	6045	xjing@uwyo.edu
Juliano, Timothy	6045	tjuliano@uwyo.edu
Khanal, Sujan	6046	skhanal@uwyo.edu
Mueller, Dana	6044	dmuelle5@uwyo.edu
Pauly, Rebecca	6044	rpauly@uwyo.edu
Pokharel, Binod	6048	bpokhare@uwyo.edu
Pokhrel, Rudra	6044	rpokhrel@uwyo.edu
Robertson, Anna	6046	arober29@uwyo.edu
Snare, Dustin	6051	dsnare@uwyo.edu
Sullivan, Sharon	6042	ssuli23@uwyo.edu
Sulskis, Jason	6042	jsulskis@uwyo.edu
Tripp, Adam	6051	atripp1@uwyo.edu
Welsh, Daniel	6045	Dwelsh6@uwyo.edu
Wu, Mingxuan	6051	mwu1@uwyo.edu
Yang, Jing	6048	jyang4@uwyo.edu
Zhou, Yun	6049	yzhou6@uwyo.edu