Personal Information

Freja Nordsiek

Name	
Previous Name	Hansen Nordsiek (before July 2013)
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GitHub	https://github.com/frejanordsiek (open source software contributions)
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Nationality	USA

Education

2010–Present	Pursuing **Ph. D. in Physics** (completion expected 2015)
Institution	University of Maryland, College Park, MD, USA
2006–2010	**B. Sc. in Physics**
Institution	Michigan Technological University, Houghton, MI, USA

Research Positions

January 2010 – Present	**Graduate Research Assistant**
Laboratory	Nonlinear Dynamics Laboratory
Advisor	Professor Daniel P. Lathrop
Institution	University of Maryland, College Park, MD, USA Department of Physics and Institute for Research in Electronics and Applied Physics (IREAP)
Topics	*Rotating turbulence and transport in experimental Rayleigh-stable Taylor-Couette* *Granular electrification in a table-top experiment*
May 2007 – August 2010	**Undergraduate Researcher Assistant**
Laboratory	Cloud Physics Laboratory
Advisor	Professor Raymond A. Shaw
Institution	Michigan Technological University, Houghton, MI, USA Department of Physics
Topics	*Dynamics of electrically charged/uncharged water droplets in turbulent air and calibration and particle matching for dual-camera inline holography system*

June 2009 – August 2009	**Undergraduate Research Assistant**
Laboratory	Nonlinear Physics and Fluid Dynamics Laboratory
Advisor	Professor Jerry P. Gollub
Institution	Haverford College, Haverford, PA, USA
	Department of Physics
Topics	*Dynamics of inertial particles in oscillating quasi-2D flow*

Peer Reviewed Publications

1 **F. Nordsiek**, S. G. Huisman, R. C. A. van der Veen, C. Sun, D. Lohse, and D. P. Lathrop
Azimuthal velocity profiles in Rayleigh-stable Taylor-Couette flow and implied axial angular momentum transport
Journal of Fluid Mechanics, **774**, 342–362 (2015)
DOI: 10.1017/jfm.2015.275
arXiv: 1408.1059 [physics.flu-dyn]

2 J. Lu, **H. Nordsiek**[1], and R. A. Shaw
Clustering of settling charged particles in turbulence: theory and experiments
New Journal of Physics, **12**, 123030 (2010)
DOI: 10.1088/1367-2630/12/12/123030

3 J. Lu, **H. Nordsiek**[1], E. W. Saw, and R. A. Shaw
Clustering of charged inertial particles in turbulence
Physical Review Letters, **104**, 184505 (2010)
DOI: 10.1103/PhysRevLett.104.184505

4 J. Lu, J. P. Fugal, **H. Nordsiek**[1], E. W. Saw, R. A. Shaw, and W. Yang
Lagrangian particle tracking in three dimensions via single-camera in-line digital holography
New Journal of Physics, **10**, 125013 (2008)
DOI: 10.1088/1367-2630/10/12/125013

Talks

1 2015 APS March Meeting, San Antonio, TX, USA
Electrical charging in shaken granular media

2 2014 APS Division of Fluid Dynamics Meeting, San Francisco, CA, USA
Electrical charging in shaken granular media

3 2014 APS March Meeting, Denver, CO, USA
Electrical charging of granular media in a shaking experiment

4 2013 APS Division of Fluid Dynamics Meeting, Pittsburgh, PA, USA
Angular momentum transport and flow super-rotation in Rayleigh stable Taylor-Couette

5 18th International Couette-Taylor Workshop, University of Twente, The Netherlands
Angular Momentum Transport and Velocimetry in Rayleigh Stable Taylor-Couette Flow

[1] Under previous name of Hansen Nordsiek.

6 **Invited:** Princeton Plasma Physics Laboratory, Princeton, NJ, USA
Angular Momentum Transport And Velocimetry in Quasi-Keplerian Taylor-Couette Flow

7 2012 APS Division of Fluid Dynamics Meeting, San Diego, CA, USA
Transitions and Reynolds number scaling in quasi-Keplerian Taylor-Couette flow

8 2011 APS Division of Fluid Dynamics Meeting, Baltimore, MD, USA
Axial velocimetry and torque scaling in turbulent Taylor-Couette flow with independently rotating cylinders

9 2009 APS Division of Fluid Dynamics Meeting, Minneapolis, MN, USA
Experimental Investigation of Charged Inertial Particles in Turbulence

Posters

1 2014 Burgers Symposium, College Park, MD, USA
Electrical charging of granular media in a shaking experiment

2 2014 Granular and Granular-Fluid Flow Gordon Research Conference/Seminar, Easton, MA, USA
Electrical charging of granular media in a shaking experiment

3 2012 Dynamics Days Meeting, Baltimore, MD, USA
Axial Velocimetry and Torque Scaling in Turbulent Taylor-Couette Flow with Independently Rotating Cylinders

Open Source Software Packages Written

1 hdf5storage
Utilities to read/write Python types to/from HDF5 files, including MATLAB v7.3 MAT files.
Python
https://pypi.python.org/pypi/hdf5storage

2 GeminiMotorDrive
Utilities to control Parker Hannifin Gemini stepper/servo motor drives.
Python
https://pypi.python.org/pypi/GeminiMotorDrive

Skills

Fluid Measurement
- LDV/LDA (Laser Doppler Velocimetry/Anemometry))
- 3D Holographic PTV (Particle Tracking Velocimetry)
- CTA (Constant Temperature Anemometry)
- UDV (Ultrasound Doppler Velocimetry)
- Fluorescence dye injection and visualization
- Rheology (viscosity and density)

Fluid Simulation
- DNS (Direct Numerical Simulation): 3D periodic box via pseudo-spectral methods
- DNS: axisymmetric Taylor-Couette via finite differences on stream-function representation

Optical Systems	Single and dual camera inline holography with particle stereo-matching and tracking Fluorescent imaging with inline illumination
Mechanical Systems	Variable speed AC rotary/linear motors and drives with filtering and controls Rotating machinery with on-board computer control and data acquisition Vacuum systems Temperature control
Data and Camera Acquisition	Custom triggered multi-exposure multi-camera acquisition system and software Full acquisition and control electronics and software systems for experiments Drivers, language bindings, and remote acquisition systems for DACs and DAQs
Fabrication	Part design, milling machine, lathe, aviation riveting
Electronics	Data acquisition, experiment control, sensors, embedded microcontrollers, variable speed AC motor drives including filtering, PCB board design and etching (single side)
Programming Languages	Expert: *Python with NumPy+SciPy+matplotlib, MATLAB/Octave, C, C#* Skilled: *Fortran 77, C++, Bash, assembly for Zilog Z80 and x86* Novice: *IDL, Java, Ruby, Clojure*
Software Development	Multi-threading, inter-process communication, camera capture software (MATLAB and Matrox), embedded microcontrollers, GUIs with custom controls, GNU/Linux and Windows, HDF5, custom file formats, RS232, SPI, GNU Autotools, Git, Subversion, documentation, web development (HTML, CSS, and PHP), LaTeX + BibTeX

Awards and Honors

1	2009 Goldwater Scholar
2	Sigma Pi Sigma (2009)

Professional Affiliations

1	American Physical Society (APS)
2	Sigma Pi Sigma

Teaching Experience

Fall 2010	**Graduate Teaching Assistant**
Institution	Department of Physics, University of Maryland, College Park, MD, USA
Class	Physics 174: *Physics Laboratory Introduction*
Description	Freshman introductory lab and data methods for Physics majors.
Responsibilities	Taught two lab sections along with an instructor and graded the labs and tests.
Spring 2010	**Undergraduate Teaching Assistant**
Institution	Department of Physics, Michigan Technological University, Houghton, MI, USA
Class	Physics 1361: *Intro Experimental Physics II*
Description	Freshman mechanics and introductory thermodynamics lab for Physics majors.
Responsibilities	Taught two lab sections and had responsibility for course content and grading along with another TA.

Fall 2009	**Undergraduate Teaching Assistant**
Institution	Department of Physics, Michigan Technological University, Houghton, MI, USA
Class	Physics 1161: *Intro Experimental Physics I*
Description	Freshman introductory mechanics lab for Physics majors.
Responsibilities	Taught one lab section and had responsibility for course content and grading along with another TA for that section and one additional section.