

Scientific Activities

- 2013-present South Dakota Research Innovation Center South Dakota
Director – *Biochemical Spatiotemporal Network Resource (BioSNTR)*
- 2012-present South Dakota State University Brookings, SD
Director – *Center for the Biological Control and Analysis By Applied Photonics (BCAAP)*
- 2005-2008 University of Michigan Ann Arbor, MI
Research Director – *Center for Live Cell Imaging*
- 2004-2005 University of Michigan Ann Arbor, MI
NIH - *Rheumatology Fellowship*
- 2000-2003 University of Michigan Ann Arbor, MI
NIH - *Cellular Biotechnology Training Program Fellowship*
- 2012-present Ad hoc reviewer for NIH Cell, Computational and Molecular Biology (SBIR/STTR)
- 2012 Ad hoc reviewer for the British Medical Research Council
- 2012 NSF Panel Reviewer for Instrument Development for Biological Research (IDBR)
- 2013 NIH Institute for Drug Abuse Special Emphasis Panel CEBRA: Cutting-Edge Basic Research Awards (R21)
- 2014-Present Guest Editor for *BioMed Research International*
- 2014-Present Reviewer for *Biochem Biophys Acta, Molecular Cell Research*
- 2013-Present Reviewer for *Nature Communications*
- 2013-Present Reviewer for *Science Reports*
- 2013-Present Reviewer for *Journal of Microscopy*
- 2013-Present Reviewer for *Cytometry A*
- 2013-Present Reviewer for the *Journal of Luminescence*
- 2012-Present Reviewer for *Methods*
- 2012-present Reviewer for PLoS ONE
- 2012-present Reviewer for *Microscopy and Microanalysis*
- 2007-present Reviewer for *The Journal of Theoretical Biology*
- 2004-present Reviewer for *Molecular Biology of the Cell*
- 2004-present Reviewer for *Biophysical Journal*

Honors and Awards

- 2011 Dr. Sherwood and Elizabeth Berg Young Scientist Award (SDSU)

Memberships in Professional Societies

- 2004-present Member of the Biophysical Society

2001-present Member of the American Society for Cell Biology
2000-2003 Member of the American Association for the Advancement of Science

Teaching Activities

2009-2014	South Dakota State University	Brookings, SD
<i>Alt. Spring term</i>	<i>Graduate Biophysical Chemistry 767</i>	
2011	South Dakota State University	Brookings, SD
<i>Fall term</i>	<i>Principles of Biophysical Microscopy 691</i>	
2009-2012	South Dakota State University	Brookings, SD
<i>Fall term</i>	<i>Co-instructor Graduate Biochemistry 705</i>	
2008-2013	South Dakota State University	Brookings, SD
<i>Alt. Spring term</i>	<i>Biophysical Chemistry 348 and 348L</i>	
2008-2011	South Dakota State University	Brookings, SD
<i>Alt. Spring term</i>	<i>Coordinator, Biochemistry Lab 466</i>	
2007	University of Michigan	Ann Arbor, MI
<i>winter term</i>	<i>Lecturer for Cellular Biotechnology 504</i>	
2006	University of Michigan	Ann Arbor, MI
<i>winter term</i>	<i>Co-Course Director and Lecturer for Cellular Biotechnology 504</i>	
2004 & 2005	University of Michigan	Ann Arbor, MI
<i>winter terms</i>	<i>Course Director and Lecturer for Cellular Biotechnology 504</i>	
2004	Directed a training workshop on FRET microscopy and data analysis during the EAMNET Workshop on Dynamic Imaging Microscopy & Analysis for Biologists Pasteur Institute, June 2004, Paris, France	
2000-2002	University of Michigan	Ann Arbor, MI
	<i>Graduate Student Instructor for Cellular Biotechnology 504 (2 terms)</i>	
1998-1999	University of Wisconsin	Madison, WI
	<i>Graduate Student Instructor for Radioisotopes in Nuclear Medicine</i>	
	Assisted in teaching a laboratory course graduate students and nuclear medicine fellows in the use of radioisotopes and advanced nuclear medicine imaging modalities.	

Extramural Funding

SDRIC (South Dakota Research Innovation Center): Biochemical Spatiotemporal Network Resource (BioSNTR); Building a Bio-economy in South Dakota.

Project Director/Principle Investigator: **Adam Hoppe**, (Co-PI): Anne Fennel, Senthil Subramanian, Ron Utecht Steve Smith, Suvo Chakravarty, Dan Engebretson.
\$11,807,150 (100%)¹
(June 2013 – June 2019)

SD Governor's Research Center: Center for the Biological Control and Analysis by Applied Photonics.
(BCAAP) PI/Director (2012): Adam D. Hoppe
\$4,295,769 (direct)
(May 2009 – May 2014)

NSF, CAREER: Simultaneous 3D-Imaging of Multiple Molecular Interactions within Living Cells.
0953561
PI : Adam Hoppe
\$784,966 (total)
(April 2010 – April 2015)

NIH F32: Imaging the Cbl/ubiquitin control of MCSFR signaling on macrophage plasma membranes.
Fellow: Shalini Low-Nam;
Mentor: Adam Hoppe
GRANT11106237
\$145,296
(April, 2013 – April 2015)

NSF EPSCOR RII, track I: The 2020 Vision: Building Research, Education, and Innovation Partnerships for South Dakota
NSF 1355423
Project Director Jame Rice, Co-PI: **Adam Hoppe**, Carol Lushbough and Mel Ustad
\$24,000,000 (~50%)¹
(August 2014 – August 2019)

NIH R15 Chlamydial lipid acquisition and host response.
PI: Lisa Moore, Co-I: **Adam Hoppe**
\$430,000 (8%)¹
(July 2014- July 2017)

Previous Extramural Funding

NIH, RMRCE Mechanism of ISG15-mediated antiviral response.
\$40,000 (direct)
Co-PIs: Feng Li, Adam Hoppe and Linhong Jin
(Jan 2010 – April 2010)

SD Competitive Research Grant Program – Development of high-resolution imaging of receptor signaling complexes on the surfaces of living cells.

PI: Adam Hoppe

\$93,271 (direct)

(Aug. 21, 2010- Aug. 22, 2011)

Invited Presentations

Sanford Research & SDSU Symposium on Biomedical Research, Sioux Falls, SD, Nov. 2013, “From Phagocytosis to Antigen Presentation: How Cell Surface Dynamics Influence the Immune Response”

University of Minnesota Physics Department, Minneapolis, MN, Sept. 2013, (Host: Joachim Mueller) “New approaches for imaging the nanoscale organization of receptor signaling and membrane topography in living cells.”

South Dakota State University Life Sciences Seminar, Sept. 2013, “The Biochemical Spatiotemporal Network Resource (BioSNTR), Catalyzing Interdisciplinary Research in South Dakota.”

1st SDSU Annual Symposium on Biological Computing, Brookings SD, March 2013, “Analyzing subcellular biochemical dynamics with optical and computational lenses.”

South Dakota State University Physics March, 2013, (Host: Robert McTaggart) “How physics is revolutionizing biology and biochemistry: Stories from a practicing biophysicist about the interface of molecules and life.”

Symposium on Understanding Cell Behavior through Single Cell and Single Molecule Biology, University of New Mexico, Jan. 2013, “Imaging membrane curvature dynamics during endocytosis.”

University of South Dakota, Biomedical Engineering, Sioux Falls, SD, November 2012, (Host: Dan Engebretson). “Imaging membrane curvature during clathrin-mediated endocytosis.”

University of Nebraska Medical Center, Eppley Institute for Research in Cancer and Allied Diseases, Omaha, NE, August 2012, (Host: Hamid Band) “Imaging the Life and Death of the Macrophage Colony Stimulating Factor Receptor: A story about Signaling, Endocytosis and Macropinocytosis”

Sanford Research, SDSU-Sanford Symposium on Cellular Biochemistry, June 2012, “Imaging Signal Transduction and Membrane Transport in Living Macrophages.”

University of Michigan, Departments of Biophysics and Microbiology and Immunology, May

2012, Ann Arbor, MI (Hosts: Jennifer Ogilvie and Joel Swanson) “Exploring New Frontiers in Receptor Control of Macrophage Function by Novel Live-Cell Imaging Approaches.”

North Central Chapter of the Health Physics Society, April 2012, Brookings, SD, (Host: Robert McTaggart) “Imaging in Medical Physics and Biophysics: Form to Function”

South Dakota State University, Mathematics and Statistics Seminar, March 2012, Brookings, SD (Host: Xijin Ge), “Maximum Likelihood Estimation, Linear Algebra and Fluorescence Microscopy, Working Together to See Biochemistry Within Single Living Cells”

NSF CAREER Proposal Development Workshop, Sioux Falls, SD, December 2011 (Organized by James Rice). “CAREER Program Panel (with SD CAREER Award Winners)”

South Dakota State University Life Science Seminar, January 2011, Brookings, SD, (Host: Feng Li). “Exploring Receptor Control of Macrophage Function by Novel Live-Cell Microscopy.”

Avera Symposium on Research, September 2011, Sioux Falls, SD (Host: Ryan Hansen). Panel on Collaborative Research

Augustana College, Department of Biology, September 2011, (Host: Mark Larson), “Exploring New Frontiers in Receptor Control of Macrophage Function by Novel Live-Cell Imaging Approaches”

SD EPSCOR and the American Chemical Society, Workshop on Preparing for Life after Graduate School, June 2011, Chamberlain, SD, (Organized by James Rice) “Life as a Research Intensive Faculty.”

University of South Dakota Medical School, March 2011, (Host: Victor Huber) “Exploring New Frontiers in Receptor Control of Macrophage Function by Novel Live-Cell Imaging Approaches”

NSF CAREER Proposal Development Workshop, Sioux Falls, SD, November 2010 (Organized by James Rice). “CAREER Program Panel (with SD CAREER Award Winners)”

South Dakota State University, Geospatial Science & Engineering Ph.D. Program, February 2009, Brookings, SD (Host: Geoffrey Henebry), “From Kilometers to Nanometers: Using Spectral Unmixing and Image Reconstruction to Study Molecular Processes inside Single Living Cells.”

South Dakota State University, Life Science Seminar Series, January 2009, Brookings, SD (Host: Feng Li), “Exploring New Frontiers in Receptor Control of Macrophage Function by Novel Live-Cell Imaging Approaches.”

North Dakota State University, Chemistry and Biochemistry Seminar Series, October 2009,

Fargo, ND (Host: Kent Rodgers), “Imaging Signaling Biochemistry in Living Cells by Fluorescence Resonance Energy Transfer.”

University of South Dakota Biomedical Engineering, 2009, Sioux Falls, SD (Host: Dan Engebretson) “Imaging Signaling Biochemistry in Living Cells by Fluorescence Resonance Energy Transfer”

San Francisco State University, September 2009 San Francisco, CA, Imaging Signaling Biochemistry in Living Cells by Fluorescence Resonance Energy Transfer.”

University of Nebraska Omaha, September 2009, Omaha, NE, Imaging Signaling Biochemistry in Living Cells by Fluorescence Resonance Energy Transfer.”

Ohio State University, February 2008, Columbus OH, (Host: Stephanie Seveau) “The cutting-edge of FRET technology: Insights into the organization of macrophage signal transduction.”

Gordon Conference on Microbial Toxins and Pathogenicity, July 2006, Proctor Academy, Andover, NH, (Chair: Drusilla Burns), "FRET microscopy: Imaging the molecular mechanisms of bacterial invasion and innate immune response."

Society of Optical Engineering (SPIE), Photonics West, January 2006, San Francisco (Chairs: Ammasi Periasamy and Peter T. C. So) “Three Dimensional FRET microscopy.”

EAMNET Workshop Dynamic Imaging Microscopy & Analysis for Biologists, Symposium on Emerging Technologies, Pasteur Institute, June 2005, Paris, France (Host: Spencer Shorte). “Three Dimensional FRET microscopy.”

NIH/NIAID – Rocky Mountain Labs, September 2004, Hamilton, MT (Host: Ted Hackstadt). “FRET Stoichiometry Reveals Distinct Patterns of Cdc42, Rac1 and Rac2 Activation during Phagocytosis.”

Saarland University, June 2004, Homburg/Saar, Germany (Host: Peter Lipp) “FRET Stoichiometry Reveals Distinct Patterns of Rac and Cdc42 Activation During Phagocytosis.”

EAMNET Workshop on Dynamic Imaging Microscopy & Analysis for Biologists, Symposium on FRET Microscopy, Pasteur Institute, June 2004, Paris, France (Host: Spencer Shorte) “Imaging Protein-Protein Interactions by FRET Microscopy.”

Japan Society of Cell Biology, May 2004, Osaka, Japan (Host: Tamotsu Yoshimori) “FRET Stoichiometry Reveals Distinct Patterns of Cdc42, Rac1 and Rac2 Activation during Phagocytosis.”

American Society of Cell Biology, December 2003, San Francisco, CA

“Cdc42, Rac1 and Rac2 Display Distinct Patterns of Activation during Phagocytosis.”

Other Platform Presentations

The Biophysical Society, March 2011, Baltimore, MD, “N-Way FRET Microscopy for Imaging Multiple Molecular Interactions Within a Single Living Cell”

Sioux Valley American Chemical Society Undergraduate Poster Competition, September 2009, Augustana College, Sioux Falls, SD (Host: Matt Miller) “Imaging Biochemistry in Living Cells by Fluorescence Resonance Energy Transfer.”

South Dakota State University Department of Pharmacy, 2009, Brookings, SD (Host: Omathanu Perumal) “Exploring New Frontiers in Receptor Control of Macrophage Function by Novel Live-Cell Imaging Approaches.”

South Dakota State University Board of Trustees, 2009, Brookings, SD The New Microscopy: Seeing the Biochemistry of Immune Response.

Society of General Physiologists, September 2006, Woods Hole, MA, (Chairs: Sergio Grinstein and Joe Falke) Meeting on Chemotaxis, Invasion and Phagocytosis: From Bacteria to Humans, “Coordination of ARF- and Rho-Family GTPases during Phagocytosis by a PI-3K-mediated Signal Transition.”

The Biophysical Society, February 2005, Los Angeles, CA
“Three Dimensional FRET Microscopy.”

American Society of Cell Biology, December 2002, San Francisco, CA
“Quantitative Imaging of Small G-protein Activation in Macrophages by FRET.”

American Society of Cell Biology, December 2001, Washington, DC
“Local and Transient Generation of Phosphatidylinositol 3,4,5-Trisphosphate During Fc γ Receptor-Mediated Phagocytosis in Macrophages.”

American Physical Society, March 1997, St. Louis, MO
“Infrared and Swelling Study of the Hydration-Induced Phase Transition of Wet-Spun Hyaluronate Films.”

Bibliography

Scott, B. L. and **Hoppe, A. D.** (2015) “Optimizing fluorescent protein trios for 3-Way FRET imaging of protein interactions in living cells,” *Scientific Reports (in Press)*.

Lou, J., Low-Nam, S., Kerkvliet, J., and **Hoppe, A. D.**, (2014) “Delivery of the CSF-1R to the lumen of macropinosomes promotes its destruction in macrophages.” *J. Cell Sci* 127, 5228-5239.

Sheng, Z., Ran Z., Wang, D., **Hoppe, A. D.**, Simonson, R., Chakravarty, S., Hause, B.M., Li, F., (2014) “Genomic and Evolutionary Characterization of a Novel Influenza-C-like Virus from

Swine.” (2013, In Press, Epub ahead of print). *Arch. Virol.* Feb;159(2):249-55. doi: 10.1007/s00705-013-1815-3

Hoppe, A.D., Scott, B.L., Welliver, T.P., Straight, S.W., Swanson, J.A. (2013). N-Way FRET Microscopy of Multiple Protein-Protein Interactions in Live Cells. *PLOS one.* 8(6): e64760

Lin, J. and **Hoppe, A. D.** (2013) “Uniform TIRF Illumination Enables Live Cell FRET Microscopy.” *Microscopy and Microanalysis.* 19(2):350-9 (**Paper of the year**)

Hause B. M., Ducatez, M., Collin, E.A., Ran, Z., Lui, R., Sheng, Z., Armein, A., Kaplan, B., Chakravarty, S., **Hoppe, A. D.**, Webby, R. J., Simonson, R. R., Li, F., (2013) "Isolation of a novel swine influenza virus from Oklahoma in 2011 which is distantly related to human influenza C viruses" *PLoS Pathogens.* 9(2): e1003176. doi:10.1371

Brenner, M. H., Cai, D., Nichols, S. R., Straight, S. W., **Hoppe A. D.**, Swanson, J. A., Ogilvie, J.P. (2012). Pulse Shaping Multiphoton FRET Microscopy. *Proc. SPIE* 1;8226.

Baruah, M. Huntimer, E. D. Mahmoud, S. A. **Hoppe, A. D.** Halaweish, F. (2012) T Selective BODIPY Based Fluorescent Chemosensor for imaging Pb²⁺ ion in living cells. *Tetrahedron Letters* 53(33) 4273-4275.

Zhang, Y., **Hoppe, A. D.**, Swanson, J. A., (2010). Coordination of Fc receptor signaling regulates cellular commitment to phagocytosis. *Proc. Natl. Acad. Sci.* 107(45): 19332-19337.

Sun, X., Fontaine, J.M., **Hoppe, A. D.**, Carra S., DeGuzman C., Martin J.L., Simon S., Vicart P., Welsh M.J., Landry J., Benndorf R., (2010). Abnormal interaction of motor neuropathy-associated mutant HspB8 (Hsp22) forms with the RNA helicase Ddx20 (gemin3). *Cell Stress Chap.* 15(5):567-82.

Beemiller, P., Zhang, Y., Mohan, S., Levinsohn, J., Gaeta, I., **Hoppe, A. D.**, Swanson, J. A., (2010). A Cdc42 Activation Cycle Coordinated by PI 3-kinase during Fc Receptor-mediated Phagocytosis. *Mol. Biol. Cell.* 21(3) 470-480.

Mehta, K., **Hoppe, A.D.**, Kainkaryam, R., Woolf, P., Linderman, J. J., (2009). A computational approach to inferring cellular protein-binding affinities from quantitative fluorescence resonance energy transfer imaging. *Proteomics* 9:5371-5383.

Hogue, I. B., **Hoppe A. D.**, Ono, A. Quantitative FRET Microscopy Analysis of HIV-1 Gag-Gag Interaction: The Relative Contributions of CA and NC Domains and Membrane Binding. *J. Virol.* 83: 7322-7336.

Yoshida, S., **Hoppe, A. D.**, Araki, N., Swanson J. A., (2009). Sequential signaling in plasma-membrane domains during macropinosome formation in macrophages. *J. Cell. Sci.* 122:3250-3261.

- Hoppe, A. D.**, Seveau, S., Swanson, J.A. (2009). Live cell fluorescence microscopy to study microbial pathogenesis. *Cell Microbio.* 4:540-50
- Hoppe, A. D.**, Shorte, S. L., Swanson, J. A., Heintzmann, R. (2008). 3D-FRET Reconstruction Microscopy for Analysis of Dynamic Molecular Interactions in Live Cells. *Biophys. J.* 95:400-418.
- Monastyrska, I., He, C., Geng, J., **Hoppe, A.D.**, Zhijian, L., Klionsky, D.J., (2008). Arp2 Links Autophagic Machinery with the Actin Cytoskeleton. *Mol. Biol. Cell* 19(5): 1962–1975.
- Simon, S, Fontaine, J.M., Martin, J.L., Sun, X., **Hoppe A.D.**, Welsh, M.J., Benndorf, R., Vicart, P. (2007). Myopathy-associated {alpha}B-crystallin Mutants: Abnormal phosphorylation, intracellular location, and interactions with other small heat shock proteins. *J Biol Chem.* 2007 Nov 23;282(47):34276-87.
- Seveau S., Tham T. N., Payrastra B., **Hoppe A. D.**, Swanson J. A., Cossart P. (2007). A FRET analysis to unravel the role of cholesterol in Rac1 and PI 3-kinase activation in the InlB/Met signalling pathway. *Cell Microbiol.* 9(3)790-803.
- Cai, D. **Hoppe, A. D.**, Swanson, J. A., Verhey, K. J., (2007) Kinesin-1 Structural Organization and Conformational Changes Revealed by FRET Stoichiometry in Live Cells, *J Cell Biol.* 176(1):51-63.
- Fontaine, J.M., Sun, X., **Hoppe, A. D.**, Simon, S., Vicart, P., Welsh, M. J., and Benndorf, R., (2006). Abnormal small heat shock protein interactions involving neuropathy-associated HSP22 (HSPB8) mutants. *FASEB J.*, 20:2168-2170.
- Hoppe, A.D.**, Swanson, J.A., and Shorte, S.L. (2006). Three-dimensional FRET microscopy. *Proc. SPIE* 6089, 608904. (invited, not peer reviewed)
- Beemiller, P., **Hoppe, A. D.**, and Swanson, J. A., (2006). A phosphatidylinositol-3-kinase-dependent signal transition regulates ARF1 and ARF6 during Fc γ receptor-mediated phagocytosis. *PLoS Biology* 4(6):e162.
- Shaughnessy, L., **Hoppe, A. D.**, Christensen, K. A., and Swanson, J. A., (2006). Membrane perforations inhibit lysosome fusion by altering pH and calcium in *Listeria monocytogenes* vacuoles. *Cell. Microbiol.* 8(5):781-92
- Swanson J. A. and **Hoppe, A. D.** (2004). The Coordination of Signaling during Fc Receptor-mediated Phagocytosis. *J Leuk. Biol.* (76(6):1093-103)
- Mattheyses, A., **Hoppe, A. D.**, and Axelrod, D. A. (2004). Polarized Fluorescence Resonance Energy Transfer Microscopy. *Biophys J.* 87, 2787-2797.
- Hoppe, A. D.**, and Swanson, J. A. (2004). Cdc42, Rac1 and Rac2 Display Distinct Patterns of Activation during Phagocytosis. *Mol. Biol. Cell.* 15(8), 3509-19.

Henry, R., **Hoppe, A. D.**, Joshi, N., and Swanson, J. A. (2004). The Uniformity of Phagosome Maturation in Macrophages. *J Cell Biol.* 164(2), 185-94.

Hoppe, A., Christensen, K., and Swanson, J. A. (2002). Fluorescence Resonance Energy Transfer-Based Stoichiometry in Living Cells. *Biophys J.* 83, 3652-3664.

Marlowe, R. L., **Hoppe, A.**, Rupprecht, A., and Lee, S. A. (1999). Mediation of a phase transition in hyaluronate films by the counterions Li, Cs, Mg and Ca as observed by infrared spectroscopy, optical microscopy and optical birefringence. *J Biomol Struct Dyn* 17, 607-616.

Invited Book Chapters:

Hoppe, A. D. and Low-Nam, S. L., “Live-Cell TIRF Imaging of Molecular Assembly and Plasma Membrane Topography.” (eds. A. Cambi and D. Lidke), *Cell Membrane Nanodomains: From Biochemistry to Nanoscopy* (in Press, October 2014).

Hoppe, A. D. (2012) “FRET-based imaging of Rac and Cdc42 activation during Fc-receptor-mediated phagocytosis in macrophages” (ed. Francisco Rivero) *Meth. Mol. Bio.* 827;827:235-51.

Hoppe, A. D. (2007) ‘Quantitative FRET Microscopy in Live Cells’ in *Imaging Cellular and Molecular Biological Function*, (eds. Frischknecht, F. and Shorte, S. L) Pub. Springer-Verlog.

Additional non-peer review publications

Iverson, Bradley E., and **Hoppe A. D.**, (2012). “Establishment of Photo-Activated Localization Microscopy (PALM) for Imaging Signaling Complexes on the Surfaces of Cells” *J. Undergraduate Research, SDSU*, 10, 75-85.