Sarah M. Cousineau

Group Leader: Beam Science and Technology
Joint Faculty Professor: University of Tennessee Dept. of Physics and Astronomy
WBS Level 2 Manager for the Accelerator Systems STS Project

Spallation Neutron Source
PO Box 2008, MS 6461
Oak Ridge, TN 37831-6461

Phone: +1 865 406 0294
Fax: + 1 865 574 6617
scousine@ornl.gov

Current Job Responsibilities:

- Manage the Best Science and Technology (BeST) group at the Spallation Neutron Source:
  - Manage the beam performance aspects of accelerator systems, development and maintenance of accelerator beam line instrumentation, and the H^- ion source and associated system
  - Manage the accelerator physics beam study program aimed at identifying, understanding, and mitigating beam performance limitations
  - Guide and facilitate strategic plans for accelerator performance improvements, and software tools for efficient modeling and analysis of the beam
  - Promote an manage a robust R&D program targeted at high intensity, high power beams
  - Interface with other technical groups in the division, and manage the group budget
  - Promote a strong culture of safety in all activities
  - Participate in outreach and professional and community service roles
- Serve as the WBS Level-2 project manager for the Accelerator Systems portion of the SNS Second Target Station (STS) upgrade project
  - Supervise the design, procure, and install of all STS accelerator beam line subsystems
  - Manage the budget (~$50M)
- Execute responsibilities and privileges of Joint Faculty Professor at the UT Department of Physics and Astronomy
  - Serve as principle investigator on grant-funded project; supervise all activities, manage the budget
  - Provide interface between UT and SNS for research and graduate student education
  - Advise graduate students and postdocs from UT

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Research Interests

- Collective effects in high intensity beams, space charge and instabilities
- Novel injection methods for proton drivers
- Code development and simulation of high intensity beams
- Novel beam diagnostics and measurement techniques
- High power beam collimation

Grants:

- "Laser Stripping for High Intensity Synchrotrons", DOE HEP, 2013, 2016.
- "Six Dimensional Experimental Characterization of High Intensity Hadron Beams in Front End Systems", NSF, 2015.

Education:

- 2003 Ph.D. (Accelerator Physics), Indiana University
- 2000 M.S. (Accelerator Physics), Indiana University
- 1998 B.S. (Summa Cum Laude, Physics), University of North Dakota

Professional Experience:

02/2012 – present	Joint Faculty Professor, Department of Physics and Astronomy, University of Tennessee
01/2016 – present	Group Leader, Accelerator Physics, Beam Instrumentation and Experimental Techniques, and Ion Source group at the Spallation Neutron Source
01/2005 – 03/2016	R&D Staff, Accelerator Physics Group, Spallation Neutron Source
01/2003 – 01/2003	Postdoctoral Scientist, Accelerator Physics Group, Spallation Neutron Source
05/1999 – 02/2003	Graduate Research Associate, Indiana University Cyclotron Facility *(Understanding Space Charge and Controlling Beam Loss in High Intensity Synchrotrons)*
08/1998 – 05/1999	Graduate Associate Instructor Department of Physics, Indiana University
08/1996 – 08/1998	Research Assistant, Department of Physics, University of North Dakota

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	(Optical and X-ray Analysis of Isolated Galaxy Pairs)
06/1997 – 08/1997	Research Assistant, Department of Space Sciences, Cornell University
08/1995 – 06/ 1998	Teaching Assistant, Physics and Astronomy University of North Dakota

Honors, Distinctions and Awards:

- Keynote Speaker, 2018 Tennessee Science Bowl
- DOE Women @ Energy: https://energy.gov/diversity/articles/women-energy-sarah-cousineau
- ORNL Mentor of Student Research Annual Award, 2015
- Mentor Excellence Award, U.S. Department of Energy Office of Science Undergraduate Research Activities, 2003 and 2008
- Women in Science Fellowship Recipient, 1998 – 2002
- Indiana University Department of Physics Teaching Excellence Recognition Award, 1999
- ORNL Significant Event Award for "Demonstration of Microsecond H- Laser-Assisted Stripping", 2017

Professional Service Activities

2019 - 2023	Vice-Chair (elect), American Physical Societiy (APS) Division of Physics of Beams (DPB), Executive Committee
2018	Scientific Program Coordinating Committee, North American Particle Accelerator Conference 2019
2017 – present	International Organizing Committee, ICFA High Intensity High Brightness Hadron Beam Workshop Series
2016 – present	Advisory Council Member, US Particle Accelerator School (USPAS)
2015 – present	Chair, USPAS Curriculum Committee
2015 – present	APS DPB Education and Outreach Committee
2012 – 2018	International Organizing Committee, International Computational Accelerator Physics Conference
2004 – present	Instructor, "Fundamentals of Accelerator Physics" U.S. Particle Accelerator School (2007, 2011, 2014, 2017, 2019)

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2017, 2018, 2019	IPAC Student Travel Award Committee
2017, 2016, 2015	IPAC Scientific Advisory Board
2013 – 2016	Editorial Board Member, Physical Review Accelerators and Beams (PRAB)
2015	USPAS Prize Committee
2010 – 2013	Member At Large, Executive Committee, American Physical Society Division of Physics and Beams
2006 - present	Member, American Physical Society Division of Beams

Reviews and Panels

- Thomas Jefferson National Accelerator Laboratory Facility Operation Review (2018)
- Thomas Jefferson National Accelerator Laboratory Biennial S&T Review (2017)
- Management Advisory Committee, PIPII Project (2017 – present)
- NSF Comparative Review Panel (Internal reviewer)

Outreach Activities

2017 – present	Member, Organizing Committee, ORNL Women in Neutron Science group
2018	2018 Tennessee Science Bowl Keynote Speaker
2017	MCIDS STEM High School 2017 Annual Harbison Lecturer
2009, 2010	Instructor, “SNS to the Classroom”, an ORISE workshop high school teachers
2007 – 2008	Vice-President, Committee for Women, ORNL
2005 – 2008	Member, Committee for Women, ORNL
2006 - present	Oak Ridge Associated Universities student mentor and SULI program lecturer
2006 - 2009	Annual Tennessee High School Science Bowl volunteer
2006 - 2009	Annual ORNL Day of Science student panel chair
2005	“Einstein in the City” high school science fair organizer, 2005 Particle Accelerator Conference

Refereed Publications and DOE Highlights:

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1. J. Holmes, **S. Cousineau**, N. Evans, T. Gorlov, and M. Plum, *Feasibility Study for Painting a Self-Consistent Beam into the Spallation Neutron Source Accumulator Ring*, Phys. Rev. Accel. Beams, accepted.
2. B. Cathey**, S. Cousineau,** A. Aleksandrov, A. Zhukov, *First Six Dimensional Phase Space Measurement of an Accelerator Beam*, Phys. Rev. Lett., **121**, 064804 (2018)
3. **S. Cousineau** et al., *High efficiency laser-assisted H- charge exchange for miscrosecond duration beams*, Phys. Rev. Accel. Beams, **20**, 120401 (2017).
4. **S. Cousineau** et al., *First Demonstration of Laser-Assisted Charge Exchange for Microsecond Duration H- Beams*, Phys. Rev. Lett., **118**, 078401 (2017)
5. **S. Cousineau** et al., "Laser Stripping Powers Protons", DOE HEP Highlight, https://science.energy.gov/hep/highlights/2017/hep-2017-07-a/
6. Y. Liu, A. Rakhman, A. Menshov, A. Webster, T. Gorlov, A. Aleksandrov, and **S. Cousineau**, *Laser and Optical System for Laser Assisted Hydrogen Ion Beam Stripping at SNS,* Nuclear Instruments and Methods A, 857, p 171 (2017)
7. S. Henderson et al., *The Spallation Neutron Source Accelerator System Design*, NIM A 763 (2014)
8. J.A. Holmes, **S. Cousineau**, V. Danilov, L. Jain, *Comparison Between Measurements, Simulations, and Theoretical Predictions of the Extraction Kicker Transverse Dipole Instability in the Spallation Neutron Source*, Phys. Rev. ST Accel. Beams, **14**, 074401 (2011)
9. **S. Cousineau**, J.A. Holmes, M. A. Plum, W. Lu, *Dynamics of Uncaught Foil-Stripped Electrons in the Spallation Neutron Source Accumulator Ring*, Phys. Rev. ST Accel. Beams, **14**, 064001 (2011).
10. M. Plum, **S. Cousineau**, J. Galambos, S.H. Kim, P. Ladd, C.F. Luck, C.C. Peters, Y. Polsky. R. W. Shaw, R. J. Macek, and D. Raparia*, Stripper Foil Failure Modes and Cures at the Oak Ridge Spallation Neutron Source*, Phys. Rev. ST Accel. Beams, **14**, 030101 (2011)
11. T. Pelaia and **S. Cousineau**, *A Method for Probing Machine Optics By Constructing Transverse Real Space Beam Distributions Using Beam Position Monitors*, Nucl. Instr. and Methods A, accepted (2008)
12. D. Jeon, J. Stovall, H. Takeda, S. Nath, J. Billen, L. Young, I. Kisselev, A. Shishlo, A. Aleksandrov, S. Assadi, C.M. Chu, **S. Cousineau**, V. Danilov, J. Galambos, S. Henderson, S. Kim, L. Kravchuk, E. Tanke, *Acceptance Scan Technique for the Drift Tube Linac of the Spallation Neutron Source*, Nucl. Instr. and Methods A, **570** (2), p. 297 (2006)

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13. **S. Cousineau**, *Space Charge and High Intensity Beam Issues in the Design and Commissioning of the Spallation Neutron Source Accelerator,* Nucl. Instr. and Methods A, **561** (2), p. 187 (2007)
14. **S. Cousineau**, V. Danilov, J. Holmes, R. Macek, *Space-Charge-Sustained Microbunch Structure in the Los Alamos Proton Storage Ring*, Phys. Rev. ST Accel. Beams, **7**, 094201 (2004)
15. V. Danilov, **S. Cousineau**, J. Holmes, S. Henderson, *Self-Consistent Time Dependent Two Dimensional and Three Dimensional Space Charge Distributions with Linear Force*, Phys. Rev. ST Accel. Beams **6,** 094202 (2003)
16. **S. Cousineau**, V. Danilov, A. Fedotov, J. Holmes, S.Y. Lee, *Studies of Resonant Beam Behavior in the Proton Storage Rin*g, Phys. Rev. ST Accel. Beams **6**, 074202 (2003)
17. **S. Cousineau**, A. Fedotov, J. Holmes, J. Galambos, R. Macek, J. Wei, *Space Charge Induced Resonance Excitation in High Intensity Rings*, Phys. Rev. ST. Accel. Beams **6**, 034205 (2003)
18. M. Henriksen and **S. Cousineau**, *An X-ray Survey of Galaxies in Pairs*, Astrophysical Journal **511**, 595 (1999)
19. **S. Cousineau**, *Constructing a Celestial Calendar Wheel*, The Physics Teacher **37**, 477 (1999)

Selected Invited Talks and Seminars:

- "R&D Challenges at the Spallation Neutron Source High Power Accelerator," Invited Seminar, The University of Chicago Department of Physics (Chicago, 2018)
- "Accelerators: The World's Largest Scientific Tools," Keynote Opening Seminar, 2018 Tennessee Science Bowl
- "A Hitchhikers Guide to Accelerators and Life as an Accelerator Physicist," Annual Harbison Lecture, MICDS (St. Louis, 2017)
- "Laser Stripping: A Novel Method for Achieving High Density Beams in Future Accelerators," Opening Plenary, Conference for Undergraduate Women in Physics (Norfolk, 2016)
- "High Power Proton Facilities: Operational Experience, Challenges, and the Future", Closing Plenary, International Particle Accelerator Conference (Richmond, 2015)
- "The Spallation Neutron Source: A Hitchhikers' Guide", Nuclear Group seminar (University of Kentucky, 2015)

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- "Preparations for a 10 us Laser Stripping Demonstration", 2014 International Particle Accelerator Conference (Dresden, 2014)
- "Beam Physics Challenges at the Spallation Neutron Source Accelerator", Department of Physics and Astronomy Colloquium, University of Tennessee, (Knoxville, 2012)
- "Status of High Intensity Effects in the Spallation Neutron Source Accumulator Ring", 2011 Particle Accelerator Conference (New York, 2011)
- "Instability Observations in the Spallation Neutron Source Accumulator Ring", ICFA Workshop for High Intensity, High Brightness Beams (Nashville, 2008).
- "Experimental Observations and Simulations of Electron-Proton Instabilities in the Spallation Neutron Source Accumulator Ring", ICFA Workshop on Electron Clouds (S. Korea, 2007)
- "Accumulation of High Intensity Beam and First Observations of Instabilities in the SNS Accumulator Ring", ICFA Workshop for High Intensity, High Brightness Beams (Japan, 2006)
- "Benchmark of Space Charge Simulations and Comparison with Experimental Results for High Intensity, Low Energy Accelerators," Particle Accelerator Conference (Knoxville, 2005)
- "Accelerator Physics Challenges in the Spallation Neutron Source Accumulator Ring", Seminar at the Advanced Photon Source (Argonne, 2005).
- "Simulation Tools for High Intensity Rings," Particle Accelerator Conference (Portland, 2003)