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## Curriculum Vitae

### James van Howe

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Augustana College  
Department of Physics, Engineering and Astronomy  
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### EDUCATION

**Cornell University**, Ph.D. in Experimental Physics with a minor in Theoretical Physics, August 2007.  
**Cornell University**, M.S. in Physics, May 2005.  
**University of Chicago**, B.A. in Physics, May 2001.

### ACADEMIC APPOINTMENTS

**Professor**, Department of Physics, Engineering and Astronomy, Augustana College, Rock Island, IL, Spring 2023-present, **Associate Professor**, 2013-2023, **Assistant Professor**, 2007-2013, **Department Chair**, Summer 2023- present and from 2016-2018.

Responsible for teaching physics courses and laboratory for majors and non-majors, developing curriculum, as well as running an optical signal processing lab for professional and undergraduate student research; While chair, led redesign of department curriculum for 2019 semester calendar change.

### RESEARCH EXPERIENCE

**Principal Investigator**, Ultrafast and Quantum Optics Lab at Augustana College, Rock Island, IL, 2007-present.

Responsible for directing undergraduate lab research, maintaining lab, buying equipment, building instruments, collecting data, writing grants, and training and advising undergraduate research assistants.

**Visiting Scientist**, in Roberto Morandotti and José Azaña's Nonlinear Photonics and Ultrafast Optical Processing Groups, Institut de la Recherche Scientifique Energie Matériaux Télécommunications, Varennes, QC, 2018-2020, in José Azaña's Ultrafast Optical Processing group: Summer 2016, and Summer 2012.

Collaborated with the Ultrafast Optical Processing group on various projects related to optical signal processing, ultrafast pulse generation, and quantum optical signal processing.

**Graduate Research Assistant** for Professor Chris Xu, School of Applied and Engineering Physics, Cornell University, 2003-2007

**Focus:** Ultrafast optical instrumentation; application of telecommunication techniques and nonlinear optics for the development of ultrafast pulsed laser sources for biomedical imaging and techniques in optical signal processing. Performed both experimental work and numerical simulation.

## **RELATED PROFESSIONAL WORK**

**Science and Technology Blogger** for the Optical Society of America, 2010-2013.

Responsible for regularly writing articles highlighting recent breakthroughs in optics technology and research leading up to the annual Conference for Lasers and Electro-Optics.

## **TEACHING EXPERIENCE**

**Professor**, Department of Physics and Astronomy, Augustana College, 2007-present.

Teach and develop curriculum for the following courses: PHYS 300: Optics, PHYS 366: Advanced Lab, PHYS 377: Electricity and Magnetism, PHYS 390: Signal Processing, PHYS 339: Electronic Circuits, PHYS 211: Foundations of Physics I, PHYS 212: Foundations of Physics II, PHYS 151: Principles of Physics I, PHYS 152: Principles of Physics II, PHYS 121: Elementary Physics, as well as introductory laboratory for the 100 and 200 level physics sequence. Taught and developed curriculum for PHYS 220: Introduction to Scientific Research, PHYS 105: Acoustics, First Year Inquiry 103: Science of Sound (first year writing), First Year Inquiry 101: Introduction to the Liberal Arts (first year advising seminar)

## **ADVISING**

**Research Advisor to undergraduates**, Department of Physics and Astronomy, Augustana College, 2007-present.

Advise one to two undergraduates per year in research in optics and other projects in physics and engineering.

**Academic Advisor to undergraduates**, Augustana College, 2020- present.

**Faculty Mentor to Athletic Teams:** Co-mentor to Augustana College Men's Cross Country, Fall 2016; Co-mentor to Augustana Men's Track and Field, Spring 2016; Co-mentor to Augustana Women's Cross Country, Fall 2014.

## **RELEVANT SKILLS**

- Understanding of Fourier optics, nonlinear optics, quantum optics, characterization of ultrashort optical pulses, and laser systems (particularly fiber-based).
- Experience with fiber optics, fiber-based devices and electro-optical devices: test, measurement and integration into optical instrumentation.
- Experience with RF electronics; test and measurement of high-speed electrical signals, use of pulse pattern generators and bit-error rate testing for telecommunications, integration of RF components and signals into optical instrumentation.
- Experience with quantum optical measurements, single/entangled photon detection techniques and quantum optical sources.
- Experience with numerical modeling techniques for research and teaching (Python, Matlab)
- Experience guiding and training both undergraduate and graduate students in experimental techniques and numerical simulation.
- Proficiency in metal machining
- Limited working proficiency in French.

## **AWARDS AND HONORS**

- Faculty Research Grants through Augustana's Faculty Research Committee: Sabbatical Award 2015-2016, Summer award 2008 and 2012, Standard award 2011-2012.
- Student-Faculty Partnership grant for work on Quantum Optics, Academic year 2014-2015, Summer 2015.
- Student Research Assistantship from the Augustana Research Foundation: Academic year 2015-2016, 2014-2015, 2013-14, 2011-2012 (two awards), and 2008-2009.

## **PROFESSIONAL SOCIETIES AND ACTIVITIES**

- Member of the Optica (formerly the Optical Society of America), 2004-present: Served on the External Relations Advisory Group, 2013-present; Science and Technology Blogger for Conferences, 2010-2013; founded Cornell University student chapter in 2005.

## **SERVICE AND OUTREACH**

- Volunteer paraprofessional at Garfield Elementary School, Davenport, Iowa, to help with kindergarten math curriculum ("math jobs"), winter and spring 2016.
- Co-organized a Science Technology Engineering and Math (STEM) night at Garfield Elementary School, Davenport Iowa, winter 2016, 2017, 2018.
- Served as the Optical Society of America's Young Professionals representative on the Optical Society of America's External Relations Advisory Group, 2013-2016.
- Led physics demonstrations and activities at for physics outreach at Augustana Physics Open Houses, Augustana Planetarium Open Houses, and Physics club related events, 2007-present.
- Served on Augustana's 2020 Strategic Planning Committee task force on teaching, learning, student growth and outcomes, spring 2013-winter 2014.
- Elected to serve on Augustana College's Faculty Senate (2008-2010; reelected 2011); Served on the Augustana Faculty Research Committee (2008-2012; Chair for 2011-2012; Augustana's committee to evaluate student proposals student research and award stipends (2008-2011, Chair for 2010-2011); served on Educational Policies Committee (Present, and 2016-2018); Chair of the Physics Department (present, and 2016-2018).

## **JOURNAL PUBLICATIONS**

†B. Crockett, †J. van Howe, N. Montaut, R. Morandotti, and J. Azaña, “High-Resolution Time-Correlated Single-Photon Counting Using Electro-Optic Sampling,” *Laser Phot. Rev.*, Vol. 16, No. 10, 2022.

†R. Maram, †J. van Howe, D. Kong, F. Ros, P. Guan, M. Galili, R. Morandotti, L. Oxenløwe, J. Azaña, “Frequency-domain ultrafast passive logic: NOT and XNOR gates,” *Nat. Comm.*, Vol. 11, Article No. 5839, 2020.

J. Jeon, R. Maram, J. van Howe and J. Azaña, “Programmable Passive Waveform Amplifier based on the Temporal Talbot Effect,” *Opt. Exp.*, Vol 26, No. 6, pp. 6872-6879, 2018.

R. Maram, M. Seghilani, J. Jeon, X. Li, J. van Howe, L.R. Cortés and J. Azaña, “Demonstration of input-to- output gain and temporal noise mitigation in a Talbot amplifier,” *IEEE Photon. Technol. Lett.*, Vol. 30, No. 8, pp. 665-668, 2018.

\*R. Maram, J. van Howe, L.R. Cortés and J. Azaña “Energy-preserving repetition rate control of periodic pulse trains using temporal Talbot effects,” *J. of Lightwave Tech.*, Vol. 35, No. 4, pp. 1-11, 2017.

R. Maram, J. van Howe, M. Li and J. Azaña, “Lossless Fractional Repetition-Rate Multiplication of Optical Pulse Trains,” *Opt. Lett.*, Vol. 40, No. 5, pp. 375-377, 2015.

R. Maram, J. van Howe, M. Li and J. Azaña, “Passive, Noiseless, Intensity Amplification of Repetitive Signals,” *Nat. Comm.*, Vol. 5, Article No. 5163, 2014.

M. Durst and J. van Howe, “All-fiber, Wavelength and Repetition-Rate Tunable, Ultrafast Pulse Generation in the 2.0 micron Region Without Mode-locking,” *J. of Lightwave Tech.*, Vol. 31, No. 23, pp. 3714-3718, 2013.

\*J. H. Lee, J. van Howe, C. Xu and X. Liu, “Soliton Self-Frequency Shift: Experimental Demonstrations and Applications,” *J. Sel. Topics in Quantum Elec.*, Vol. 14, No. 3, pp. 713-723, 2008.

J. van Howe, J. Lee and C. Xu, “Generation of 3.5 nJ femtosecond pulses from a CW laser without mode-locking,” *Opt. Lett.*, Vol. 32, No. 11, pp. 1408-1410, 2007.

J. van Howe, J. Lee, S. Zhou, F. Wise, C. Xu, S. Ramachandran, S. Ghalmi and M. F. Yan, “Demonstration of soliton self-frequency shift below 1300 nm in higher-order-mode, solid silica-based fiber,” *Opt. Lett.*, Vol. 32, No. 4, 340-342, 2007.

\*J. van Howe and C. Xu, “Ultrafast optical signal processing based upon space-time dualities,” *J. of Lightwave Tech.*, Vol. 24, No. 7, pp. 2649-2662, 2006.

J. van Howe, G. Zhu and C. Xu, “Compensation of self-phase modulation in fiber-based chirped-pulse amplification systems,” *Opt. Lett.*, Vol. 31, No. 11, pp. 1756-1758, 2006.

J. E. Sharping, Y. Okawachi, J. van Howe, C. Xu, Y. Wang, A. E. Willner and A. L. Gaeta, “All-optical, wavelength and bandwidth preserving, pulse delay based on parametric wavelength conversion and dispersion,” *Opt. Exp.*, Vol. 13, No. 20, pp. 7872-7877, 2005.

G. Zhu, J. van Howe, M. Durst, W. Zipfel, and C. Xu, “Simultaneous spatial and temporal focusing of femtosecond pulses,” *Opt. Exp.*, Vol. 13, No. 6, pp. 2153-2159, 2005.

J. van Howe and C. Xu, “Ultrafast optical delay line using soliton propagation between a time-prism pair,” *Opt. Exp.*, Vol. 13, No. 4, pp. 1138-1143, 2005.

J. Hansryd, J. van Howe and C. Xu, “Experimental demonstration of nonlinear phase jitter compensation in DPSK modulated fiber links,” *IEEE Photon. Technol. Lett.*, Vol. 17, No. 1, pp. 232-234, 2005.

J. van Howe and C. Xu, “Ultrafast optical delay line using a time-prism pair,” *Opt. Lett.*, Vol. 30, No. 1, pp. 99-101, 2005.

J. van Howe, J. Hansryd and C. Xu, “Multiwavelength pulse generator using time-lens compression,” *Opt. Lett.*, Vol. 29, No. 13, pp. 1470-1472, 2004.

J. Hansryd, J. van Howe, and C. Xu, “Nonlinear crosstalk and compensation in QDPASK communication systems,” *IEEE Photon. Technol. Lett.*, Vol. 16, No. 8, pp. 1975-1977, 2004.

### **CONFERENCE PROCEEDINGS**

B. Crockett, N. Montaut, J. van Howe, P. Roztock, Y. Liu, R. Helsten, W. Zhao, R. Morandotti and J. Azaña, “Enhancing the Quantum Correlation of Biphotons via Coherent Energy Redistribution,” Optical Fiber Communication Conference, 2023, San Diego, CA, March 5-9, 2023

B. Crockett, J. van Howe, N. Montaut, R. Morandotti and J. Azaña, “Detecting Biphoton States with Enhanced Resolution Through Electro-Optic Gating,” Frontiers in Optics, 2022, Rochester, NY, October 17-20, 2022.

S. Bharadwaj, J. van Howe, S. Atzeni, P. Roztock, R. Narayanan, R. Osellame, J. Azaña, W. Munro, R. Morandotti, “A scalable Design for photonic quantum random number generators” Conference on Lasers and Electro-Optics, 2021, virtual, May 9-14, 2021.

J. Jeon, R. Maram, J. van Howe and J. Azaña, “Programmable sub-harmonic optical clock recovery based on dispersion-induced inverse temporal self-imaging” Conference on Lasers and Electro-Optics, 2018, San Jose, CA, May 13-18, 2018.

J. Jeon, R. Maram, J. van Howe and J. Azaña, “Programmable passive waveform amplifier based on temporal self-imaging effects” Conference on Lasers and Electro-Optics, 2017, San Jose, CA, May 14-19, 2017.

R. Maram, J. van Howe, and J. Azaña, “Demonstration of Input-to-Output Gain in a Talbot Amplifier” IEEE Photonics Conference, 2015, Reston, VA, Oct. 4-8, 2015.

\*J. Azaña, R. Maram, J. van Howe, and M. Li and “Passive Amplification of and Real-time Averaging of Repetitive Waveforms using Talbot Effects” European Conference on Lasers and Electro-Optics, 2015, Munich, Germany, June 21-25, 2015.

R. Maram, J. van Howe, and J. Azaña, “Noise-Eating Amplifier for Repetitive Signals” IEEE Photonics Conference, 2014, San Diego, CA, Oct. 12-16, 2014.

- R. Maram, J. van Howe, M. Li and J. Azaña, "Passive Waveform Amplification by Self-Imaging" Conference on Lasers and Electro-Optics, 2014, San Jose, CA, June 8-13, 2014.
- J. van Howe, "All-fiber 10-GHz Picosecond-Pulse Generation at 1.9  $\mu\text{m}$  without Mode-locking" Conference on Lasers and Electro-Optics, 2012, San Jose, May 6-11, 2012.
- J. H. Lee (presenter), J. van Howe, C. Xu, S. Ramachandran and S. Ghalmi "Energetic Soliton Self-frequency Shift over a 240 nm in a Solid Silica-based Fiber," Postdeadline Session, Optical Fiber Communication Conference, 2007, Anaheim, CA, March 25-30, 2007.
- J. H. Lee (presenter), J. van Howe, C. Xu, S. Ramachandran, S. Ghalmi and M. F. Yan "Generation of femtosecond pulses at 1350 nm by Cerenkov radiation in higher-order-mode fiber," Optical Fiber Communication Conference, 2007, Anaheim, CA, March 25-30, 2007.
- J. van Howe (presenter) and C. Xu, "Looped Time-Lens Compression for Generation of 3.5 nJ Femtosecond Pulses from a CW Laser," Conference on Lasers and Electro-Optics, 2007, Baltimore, May 6-11, 2007.
- \*J. van Howe (presenter), J. Lee, S. Zhou, F. Wise, C. Xu, S. Ramachandran, S. Ghalmi and M. F. Yan, "Soliton self-frequency shift below 1300 nm in higher-order-mode, solid silica-based fiber," LEOS Annual 2006, Montreal, October 29-November 2, 2006.
- J. van Howe (presenter) and C. Xu, "Applications of telecom technologies to optical instrumentation," Proceedings from the SPIE, Optics East, 2006, Vol. 6388, Boston, October 1-4, 2006.
- J. van Howe (presenter), and C. Xu, "Compensation of self-phase Modulation in Fiber-Based Chirped-Pulse Amplification Systems," Conference on Lasers and Electro-Optics, 2006, Long Beach, May 21-26, 2006.
- \*J. van Howe and C. Xu (presenter), "Applications of temporal imaging in optical signal processing," Digest of the LEOS Summer Topical Meetings, 2005, pp. 211-212, San Diego, July 25-27, 2005.
- G. Zhu, J. van Howe, M. Durst, W. Zipfel and C. Xu (presenter), "Simultaneous spatial and temporal focusing of femtosecond pulses," Conference on Lasers and Electro-Optics, 2005, Vol. 2, pp. 1506-1508, Baltimore, May 22-27, 2005.
- J. E. Sharping (presenter), Y. Okawachi, J. van Howe, C. Xu, Y. Wang, A. E. Willner and A. L. Gaeta, "All-optical, continuously tunable, nanosecond pulse delay using wavelength conversion and fiber dispersion," Conference on Lasers and Electro-Optics, 2005, Vol. 2, pp. 971-973, Baltimore, May 22-27, 2005.
- J. van Howe (presenter) and C. Xu, "Ultrafast optical delay line using soliton propagation between a time-prism pair," Technical Digest of the Optical Fiber Communication Conference, 2005, Vol. 5, Anaheim, CA, March 6-11, 2005.
- J. van Howe (presenter) and C. Xu, "0.5 GHz scanning rate optical delay line," OSA annual meeting Frontiers in Optics, 2004, Rochester, NY, October 10-14, 2004.

J. van Howe (presenter) J. Hansryd, and C. Xu, “Novel multi-wavelength pulse generator for real-time WDM optical sampling,” Conference on Lasers and Electro-Optics, 2004, Vol. 2, San Francisco, May 16-21, 2004.

J. Hansryd, J. van Howe (presenter) and C. Xu, “Compensation of nonlinear phase jitter in DPSK modulated optical communications systems,” Conference on Lasers and Electro-Optics, 2004, Vol. 2, San Francisco, May 16-21, 2004.

\* Indicates invited paper or presentation

† Indicates equal contribution

### **INVITED COLLOQUIA**

“Optics in Space and Time,” Middlebury College, Spring 2019; “Ultrafast Optical Signal Processing using Space-Time Duality”: University of Iowa, Optical Science and Technology Center, Spring 2016; Saint Ambrose University, Davenport, Iowa, Spring 2016; Western Illinois University, Macomb, IL, Spring 2015.

### **PATENTS**

“Method and System for Extractable Randomness Scaling in Quantum Random Number Generators,” S. Bharadwaj, J. van Howe, Y. Jestin, J. Azaña and R. Morandotti, **US 2022/0019409 A1**, Published January 20, 2022. Status: Pending

“Method and System for the Design of Photonic Systems,” B. Maclellan, P. Roztock, J. van Howe, L. Cortés, B. Fischer, Y. Jestin, J. Azaña and R. Morandotti, **US 2021/0381953 A1**, Published December 9, 2021. Status: Pending

“Production of Optical Pulses at a Desired Wavelength by Soliton Self-frequency Shift,” C. Xu and J. van Howe, **US 8,556,824 B2**, Issued October 15, 2013.

“Production of Optical Pulses at a Desired Wavelength using Soliton Self-Frequency Shift in Higher-Order-Mode Fiber,” C. Xu and J. van Howe, **US 8,554,035 B2**, Issued October 8, 2013.

“Methods and Systems for Compensation of Self-Phase Modulation in Fiber-Based Amplification Systems,” C. Xu, J. van Howe and G. Zhu, **US 8,102,594 B2**, Issued January 24, 2012.