
Blake T. Sturtevant

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Education	University of Maine ▪ Doctor of Philosophy (Physics), 2009 ▪ Thesis title: Ultrasonic Characterization of Single Crystal Langatate ▪ Thesis advisors: Robert J. Lad (PHY), Mauricio Pereira da Cunha (EECE)	Orono, ME
	Bowdoin College ▪ Bachelor of Arts, 2003 ▪ Physics major, economics minor	Brunswick, ME
	Additional Education ▪ Certificate in Sensor Science, Engineering & Informatics ▪ Los Alamos Neutron Science Center (LANSCE) Summer School	UMaine 2009 LANL 2011
Relevant Experience	Los Alamos National Laboratory Los Alamos, NM Postdoctoral Research Associate ▪ Development of high temperature & high pressure acoustic wave sensor suite for measurement of fluid temperature, pressure, composition, and flow rate for geothermal well characterization ▪ Design and construction of high temperature & high pressure (500°C, 5000 PSI) test environment to simulate geothermal and petroleum downhole well conditions ▪ LabVIEW and MATLAB software development for instrument & process control, analog & digital I/O, user interface, data logging and analysis	2010 - Present
	University of Maine Orono, ME NSF IGERT Trainee (Sensor Science, Engineering & Informatics) ▪ Acoustic wave (AW) material property measurements on single crystals ▪ Process control software for automated data collection over arbitrary temperature ranges ▪ Crystal orientation, cutting, optical polishing for acoustic wave devices ▪ Design and measurement of surface acoustic wave devices ▪ Deposition and characterization of SiAlON thin films	2005 – 2009

University of Maine Orono, ME 2004 – 2005
Teaching Assistant

- Led recitations, workshops, and labs for introductory physics courses for science and engineering students

Princeton University Princeton, NJ 2003 – 2004
Laboratory Technician

- Calibrated and installed (Barrow, Alaska; American Samoa; NOAA ship Ka'Imimoana) AARDVark automatic air samplers
- Ar/N₂ data analysis for verifying atmospheric circulation models
- Worked on project to date fossilized corals using Uranium-Helium dating techniques

Technical Skills

Acoustics

▪ **Sample Preparation**

- X-ray diffraction (XRD) orientation and alignment of single crystal substrates
- Inner Diameter (ID) saw slicing of single crystals
- Grinding and optical polishing of acoustic wave substrates

▪ **Acoustic Wave Measurements**

- Pulse Echo time-of-flight measurements (RF burst generator, digital oscilloscopes)
- Wafer bulk acoustic wave resonance measurements (network analyzer)
- Design and measurement of surface acoustic wave devices (probe stations, network analyzers)
- Fluid property determinations using Swept Frequency Acoustic Interferometry (SFAI)
- Resonant Ultrasound Spectroscopy (RUS) measurement and modeling
- Non-contact surface morphology imaging using non-linear acoustic beams

Scattering and Diffraction

- High Resolution X-ray Diffraction (HRXRD)
- X-ray Reflectivity (XRR)
- Pole figures and rocking curves for single crystal orientation to within $\sim 0.1^\circ$
- Neutron Powder Diffraction (user on POWGEN at ORNL's SNS)

Pressure Systems

- Design and documentation of safe pressure systems per LANL Engineering Standards Manual
- High pressure (5000 PSI), high temperature (500°C) systems installation and maintenance

Thin Films

- Ultra-High Vacuum (UHV) chamber/equipment installation and maintenance
- **Film Growth and Characterization**
 - Electron cyclotron resonance (ECR) sample cleaning
 - RF reactive ion magnetron sputtering
 - Electron beam evaporation
 - X-ray Photoelectron Spectroscopy (XPS) (with ion sputter gun depth profiling)
 - Atomic force microscopy (AFM), Reflection High Energy Electron Diffraction (RHEED)

Computers

- Windows 95-Windows 7
- OriginPro
- EXPGUI (GSAS)
- Intermediate Linux user
- MATLAB
- LabVIEW
- Mathematica
- Corel Draw
- AutoCAD
- Adobe Photoshop
- Basic HTML and C++
- LaTeX

Honors

- LANL Postdoc Research Day, Outstanding Poster Award, Honorable Mention (LANL, 2012)
- Los Alamos Awards Program (LAAP) recipient (LANL, 2011)
- Chase Distinguished Research Assistantship (UMaine, 9/08-5/09)
- Best Student Paper Competition, Finalist. IEEE International Frequency Control Symposium, Besançon, France (04/09)
- NSF IGERT Trainee (NSF / UMaine, 9/05 -12/09)
- SURDNA Fellowship (Bowdoin College, 5/02-5/03)

Service and Affiliations

- Reviewer for IEEE *Transactions on Ultrasonics, Ferroelectrics and Frequency Control*
- Los Alamos Postdoc Association (LAPA) Active Member
 - President (5/2011- 11/2011)
- Member of American Physical Society
- Member of IEEE, Society of Ultrasonics, Ferroelectrics, and Frequency Control
- Alumni interviewer (in New Mexico) for Bowdoin College Admissions

Publications

- 1) **B.T. Sturtevant**, Dipen N. Sinha, Cristian Pantea, "Acoustic Nonlinearity Measurements in FC-43 Fluorocarbon up to 110°C and 2000 PSI," [in preparation for submission to *J Appl Phys*]
- 2) **B.T. Sturtevant**, Dipen N. Sinha, Cristian Pantea, "Determination of the acoustic nonlinearity parameter in liquid water up to 250°C and 2000 PSI," [in preparation for submission to *IEEE Trans. Ultrason., Ferroelect., Freq. Contr*]
- 3) **B.T. Sturtevant**, Dipen N. Sinha, Cristian Pantea, "Determination of the parameter of nonlinearity in liquid water up to 250°C and 14 MPa," [in press, *Proc. of 2012 IEEE Int'l Ultrason. Symp.*]
- 4) **B.T. Sturtevant**, M. Pereira da Cunha, R.J. Lad, "Properties of SiAlO₂N Protective Coatings on Surface Acoustic Wave Devices," [under revision, *Thin Solid Films*].
- 5) **B.T. Sturtevant**, Dipen N. Sinha, Cristian Pantea, "Evaluating the Effectiveness of the Transmission Line Model in Pulse Echo Couplant Layer Corrections," [Accepted, *IEEE Trans. Ultrason., Ferroelect., Freq. Contr*]
- 6) **B.T. Sturtevant**, Cristian Pantea, Dipen N. Sinha, "An Acoustic Resonance Measurement Cell for Liquid Property Determinations up to 250°C," *Rev. Sci. Instrum.* **83**, 115106 (2012); doi: 10.1063/1.4765746
- 7) **B.T. Sturtevant**, M. Pereira da Cunha, "Assessment of Langatate Material Constants and Temperature Coefficients Using SAW Delay Line Measurements," *IEEE Trans. Ultrason., Ferroelect., Freq. Contr.*, Vol 57, No.3, March 2010, pp. 533—539.

- 8) **B.T. Sturtevant**, M. Pereira da Cunha, "Assessment of Langatate Material Constants and Temperature Coefficients Using SAW Delay Line Measurements," *Proc. 2009 IEEE Int'l Freq. Cont. Symp.*, pp. 160—165.
- 9) **B.T. Sturtevant**, P.M. Davulis, M. Pereira da Cunha, "Pulse Echo and Combined Resonance Techniques: a Full Set of LGT Acoustic Wave Constants and Temperature Coefficients," *IEEE Trans. Ultrason., Ferroelect., Freq. Contr.*, Vol 56, No.4, April 2009, pp. 788—797.
- 10) **B.T. Sturtevant**, M. Pereira da Cunha, R.J. Lad, "Determination of the Absolute Orientation of Langatate Crystals Using X-ray Diffraction," *Proc. 2008 IEEE Int'l Ultrason. Symp.*, pp. 741—744.
- 11) D.J. Frankel, G.P. Bernhardt, **B. Sturtevant**, T. Moonlight, M. Pereira da Cunha, R.J. Lad, "Stable Electrodes and Ultrathin Passivation Coatings for High Temperature Sensors in Harsh Environments," *Proc. IEEE Sensors 2008*, pp. 82—5.
- 12) P. M. Davulis, **B.T. Sturtevant**, S. L. Duy, M. Pereira da Cunha, "Revisiting LGT dielectric constants and temperature coefficients up to 120 °C," *Proc. 2007 Int'l Ultrason. Symp.*, pp 1397-1400.
- 13) **B.T. Sturtevant**, P.M. Davulis, M. Pereira da Cunha, "A New Set of LGT Constants and Temperature Coefficients Extracted through Resonant and Pulse Echo Techniques," *Proc. 2007 IEEE Int'l Freq. Cont. Symp.*, pp 754-758.
- 14) **B.T. Sturtevant**, M. Pereira da Cunha, "BAW phase velocity measurements by conventional pulse echo techniques with correction for couplant effect," *Proc. 2006 IEEE Int'l Ultrason. Symp.*, pp 2261-2264.
- 15) Bender, M. L., D. T. Ho, M. B. Hendricks, R. Mika, M. O. Battle, P. P. Tans, T. J. Conway, **B. Sturtevant**, and N. Cassar (2005), Atmospheric O₂/N₂ changes, 1993–2002: Implications for the partitioning of fossil fuel CO₂ sequestration, *Global Biogeochem. Cycles*, 19, GB4017, doi:10.1029/2004GB002410.

Technical
Presentations

- 1) "The nonlinearity parameter, B/A, in FC-43 Fluorinert up to 373 K and 13.8 MPa," 164th Meeting of the American Acoustical Society, Kansas City, MO, October 22-26, 2012 (Oral Presentation by B. Sturtevant).
- 2) "Determination of the acoustic nonlinearity parameter in liquid water up to 250°C and 12 MPa," 2012 IEEE International Ultrasonics Symposium, Dresden, Germany, October 7-10, 2012 (Oral Presentation by B. Sturtevant).
- 3) "Sound Speed Measurements in Water up to 563 K and 11.7 MPa using a Novel and Rugged Sensor," 2012 LANL Postdoc Research Day, June 6, 2012 (Poster Presentation by B. Sturtevant).
- 4) "Coupling Layer Corrections in Pulse Echo Time-of-Flight Measurements in Solids Revisited," 2011 LANL Postdoc Research Day, June 16, 2011 (Poster Presentation by B. Sturtevant).
- 5) "Coupling Layer Corrections in Pulse-Echo Time-of-Flight Measurements in Solids Revisited," 161st Meeting of the Acoustical Society of America, Seattle, WA, May 25, 2011 (Oral Presentation by B. Sturtevant).
- 6) "Ultrasonic Characterization of Single Crystal Langatate," University of Maine, November 19, 2009 (Oral Thesis Defense).
- 7) "Characterization of Single Crystal Langatate for Acoustic Wave Device Applications," Los Alamos National Laboratory, October 19, 2009 (Invited talk).
- 8) "Assessment of Langatate Material Constants and Temperature Coefficients Using SAW Delay Line Measurements," IEEE Int'l Freq. Cont. Symp., Besançon, France, April 20-24, 2009 (Oral and Poster Presentations by B. Sturtevant).

- 9) "Determination of the Absolute Orientation of Langatate Crystals Using X-ray Diffraction," IEEE Int'l Ultrason. Symp., Beijing, China, Nov. 2-5, 2008 (Oral Presentation by B. Sturtevant).
- 10) "A New Set of LGT Constants and Temperature Coefficients Extracted Through Resonant and Pulse Echo Techniques," IEEE Int'l Freq. Cont. Symp., Geneva, Switzerland, May 28-30, 2007 (Poster Presentation by B. Sturtevant).
- 11) "BAW phase velocity measurements by conventional pulse echo techniques with correction for couplant effect," IEEE Int'l Ultrason. Symp., Vancouver, BC, Oct. 4-6, 2006 (Poster Presentation by B. Sturtevant).
- 12) "Localization by Signal Strength (LoSSt)," NSF IGERT PI Meeting, Arlington, VA, May 15-16, 2006 (Poster Presentation by B. Sturtevant).

References

Available upon request.