

Dept. of Physics
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Birth: 3/10/60 Kolkata, India
Citizenship: U.S.

I. EDUCATION:

HARVARD UNIVERSITY, Cambridge, MA

Ph.D. in Physics, March 1989.

Dissertation: " Measurement of the $4^2S_{1/2} - 4^2F_{5/2}$ Three-Photon Transition in He^+ :

A New Test of Q.E.D."

Thesis Advisor: Prof Francis M. Pipkin

YALE COLLEGE, New Haven, CT

B.S. with Honors in Physics, May 1982.

Senior Thesis: "Aspects of the Search for Parity Nonconservation in Atomic Hydrogen"

Supervisor: Prof. Edward A. Hinds

II. SUMMARY OF WORK/RESEARCH EXPERIENCE:

Director of the Science Center ["Dean of Science"]	2010-
Barclay Jermain Professor of Natural Philosophy	2017-
Professor of Physics	2006-2016
Physics Department Chair	2003-2005
Associate Prof. of Physics w/tenure, Williams College, Williamstown, MA	2001-2006
Assistant Professor of Physics, Williams College, Williamstown, MA	1994-2001
Research Assistant Professor, Physics Dept., Univ. of Washington, Seattle, WA	1993-1994
Postdoctoral Research Associate, Physics Dept., Univ. of Washington, Seattle, WA	1989-1993
Research Assistant (incl. thesis research), Harvard University, Cambridge, MA	1982-1988
Research Assistant, Atomic physics group, Yale University, New Haven, CT	1981-1982

III. GRANTS AND AWARDS

APS Prize for a Faculty Member for Research at an Undergraduate Institution	2016
APS Fellow	2007
NSF-RUI Grant (3-yr/\$347,000 + College matching funds)	2014-2017
NSF-RUI Grant (3-yr/\$285,000 + College matching funds)	2010-2014
NSF-RUI Grant (3-yr/\$229,500 + College matching funds)	2006-2010
NSF-RUI Grant (3-yr/\$230,200 + College matching funds)	2002-2006
N.I.S.T. Precision Measurement Grant (3-years/\$150,000)	1999-2002
NSF-RUI Grant (3-years/\$198,720 + \$90,809 College matching funds)	1998-2002
NSF-Major Research Initiative Grant , (w/Strait, Jones, Bolton, and Thoman) (\$143,912+\$60K College matching funds)	1997
Research Corp.-Cottrell College Scholar Award (\$39,700 + \$10K College matching funds)	1994-1997

IV. RESEARCH INTERESTS / EXPERIENCE:

Tests of fundamental physics and discrete symmetries using atoms and radiation. Measurements of parity violation in atoms as tests of electroweak physics. Diode laser spectroscopy and polarimetry of atoms. Precise Atomic structure tests in Group IIIA atoms. Diode laser stabilization and control. Techniques for low-noise, high-precision spectroscopy and signal detection. Stark effect and Faraday effect in atoms. High-precision measurements of spin-precession frequencies of atoms in vapor cells. Microwave spectroscopy of atoms. Fast and thermal atomic beams. Numerical and analytic modeling of atom-radiation interactions.

V. PROFESSIONAL AFFILIATIONS AND ACTIVITIES:

<u>American Physical Society</u> , ELECTED FELLOW	2007
Member, DAMOP, GPMFC:	1982 - present
Executive Committee of GPMFC, chair of nominating committee	2002-2005
Program Committee, Fellowship Committee of DAMOP	2011 –
Chair, Education Committee of DAMOP	2014 – 2015
<u>Sigma Xi, the Scientific Research Society</u>	
Elected as Full member	1995
Secretary/Treasurer of Williams College Chapter	1995-2009
<u>Journal Reviewer:</u>	
A.P.S. journals. (average reviews / year = 3)	1993 - present
<u>Grant Reviewer:</u>	
NSF AMOP review panel participant	2005, 2010, 2015
NSF 'Precision Measurements' program proposal review	1998 - present
Research Corporation	1996 -
NIST Precision Measurement Grant competition	2003 –
<u>Conference Chair</u>	
Atomic Physics Gordon Conference: elected vice-chair (2007), chair (2009)	

VI. INVITED SEMINARS (1994 - present)

2017

DAMOP / APS	APS Prize talk
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2015

Smith College	<i>Department colloquium</i>
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2014

Hamilton College	<i>Department colloquium</i>
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2013

U. Maryland/JQI	<i>JQI seminar series</i>
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2012

Bowdoin College	<i>Department colloquium</i>
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2011

Atomic Physics Gordon Research Conference

Precision measurements session chair, speaker

2010

Williams College

Department colloquium

Bates College

Department colloquium

2009

Yale University

AMO group seminar

Siena College

Department colloquium

Univ. of Connecticut

AMO group seminar

Williams College

Summer Science colloquium

2007

Univ. of Delaware

AMO seminar

Old Dominion Univ.

Department colloquium

2006

Adelphi University

Department Colloquium

Univ. of Maryland

AMO seminar

Union College

Department Colloquium

2005

Univ. of Montana

OPTEC laser science conference, invited talk

Univ. of Montana

Department Colloquium

2003

Amherst College

Department Colloquium

Yale University

AMO seminar

U. Connecticut

AMO seminar

2002

U.C. Berkeley

AMO seminar

Middlebury College

Department Colloquium

Colby College

Department Colloquium

2001

Harvard/ITAMP

Fundamental Symmetries workshop, invited talk

York Univ., Toronto

AMO seminar

Mt. Holyoke College

Department Colloquium

2000

Holy Cross College

Department Colloquium

1999

Colgate University

Department Colloquium

NIST/Gaithersburg

AMO seminar

1998

Williams College

Sigma Xi annual lecture series

Harvard Univ.

AMO seminar

U. Connecticut

AMO seminar

1997

Williams College
SUNY/Stonybrook
1994

Department Colloquium
AMO seminar

MIT
Amherst College
Williams College

Nuclear/Particle physics group seminar
Department Colloquium
Department Colloquium

VII. CONFERENCE PRESENTATIONS - Majumder group @Williams

[undergraduate student co-authors in bold]:

42. “Measurement of the hyperfine structure and isotope shifts in the 8p excited states of thallium and the 7p excited states of indium using two-step laser spectroscopy”. Priyanka Rupasinghe, **Sauman Cheng '16**, **Eli Hoenig '17**, **Nathaniel Vilas '17**, **Bingyi Wang '18**, and P.K. Majumder. *Contributed talk at the APS Division of Atomic Molecular and Optical Physics meeting, Sacramento, CA, June 5-9, 2017.*
41. “High-precision atomic structure measurements in Lead”. **Eli Hoenig '17**, Priyanka Rupasinghe, and P.K. Majumder. *Contributed poster at the APS Division of Atomic Molecular and Optical Physics meeting, Sacramento, CA, June 5-9, 2017.*
40. “High-precision polarizability measurements in excited states of indium using two-step spectroscopy in an atomic beam,” **Nathaniel Vilas '17**, Priyanka Rupasinghe, and P.K. Majumder. *Contributed poster at the APS Division of Atomic Molecular and Optical Physics meeting, Sacramento, CA, June 5-9, 2017.*
39. “Precise measurement of the $8P_{1/2,3/2}$ state hyperfine splittings and isotope shift in ^{203}Tl and ^{205}Tl using two-step laser spectroscopy”. **Sauman Cheng '16**, Priyanka Rupasinghe, and P.K. Majumder. *Contributed poster at the APS Division of Atomic Molecular and Optical Physics meeting, Providence, RI, May 23-27, 2016.*
38. “Precise Measurement of the Indium $6p_{1/2}$ -state polarizability using an Atomic Beam”. **Allison Carter '16**, **Ben Augebraun '15**, **Nathaniel Vilas '17**, P.M. Rupasinghe, and P.K. Majumder. *Contributed poster at the APS Division of Atomic Molecular and Optical Physics meeting, Providence, RI, May 23-27, 2016.*
37. “High precision Stark shift measurements in excited states of indium using an atomic beam”. **Benjamin Augenbraun '15**, Priyanka Rupasinghe, and P.K. Majumder. *Contributed poster at the APS Division of Atomic Molecular and Optical Physics meeting, Columbus, OH, June 8-12, 2015.*
36. “High-precision Stark shift measurements using FM spectroscopy in an indium atomic beam”. **Nathan Schine '13**, **Nathan Bricault '14**, **Benjamin Augenbraun '15** Gambhir Ranjit, and P.K. Majumder. *Contributed poster at the APS Division of Atomic Molecular and Optical Physics meeting, Madison, WI, June 2-6, 2014.*
35. “Precise measurement of the $7P_{1/2}$ and $8P_{1/2}$ hyperfine splittings and isotope shift in ^{203}Tl and ^{205}Tl using two-step laser spectroscopy.” **David Kealhofer '13**, **Gabrielle Vukasin '14**, Gambhir Ranjit, and P.K. Majumder. *Contributed poster at the APS Division of Atomic Molecular and Optical Physics meeting, Madison, WI, June 2-6, 2014.*
34. “Precise atomic beam measurement of the Stark shift within the $5P_{1/2} \rightarrow 6S_{1/2}$ transition in ^{115}In using FM spectroscopy” P.K. Majumder, **N. Schine '13**, and G. Ranjit. *contributed talk, APS Division of Atomic, Molecular, and Optical Physics Meeting, Quebec City, CA, June 3 –*

June 7, 2013.

33. “Measurement of the $7P_{1/2}$ -state hyperfine structure and isotope shift in ^{203}Tl and ^{205}Tl using two-color spectroscopy” **D. Kealhofer '13**, G. Ranjit, and P.K. Majumder. *contributed poster*, APS Division of Atomic, Molecular, and Optical Physics Meeting, Quebec City, CA, June 3 – June 7, 2013.
32. “Precise atomic beam measurement of the Stark shift within the $5P_{1/2} \rightarrow 6S_{1/2}$ transition in ^{115}In using FM spectroscopy” Gambhir Ranjit, **A. Schneider '12**, **N. Schine '13**, and P.K. Majumder. *contributed poster*, APS Division of Atomic, Molecular, and Optical Physics Meeting, Anaheim, CA, June 4 – June 9, 2012.
31. “Measuring hyperfine structure and isotope shift in the thallium $7S_{1/2} \rightarrow 7P_{1/2}$ transition using two-color spectroscopy” Gambhir Ranjit, **T. Siegel '12**, and P.K. Majumder. *contributed poster*, APS Division of Atomic, Molecular, and Optical Physics Meeting, Anaheim, CA, June 4 – June 9, 2012.
30. “Using AMO techniques to probe physics of the Standard Model (and beyond)”, *invited talk, session chair*, Atomic Physics Gordon Research Conference, Mt. Snow Resort, VT, June 26 – July 1, 2011.
29. “Precise atomic beam measurement of the Stark shift within the $5P_{1/2} \rightarrow 6S_{1/2}$ transition in ^{115}In ” Gambhir Ranjit, **A. Lorenzo '11**, and P.K. Majumder. *contributed poster*, Atomic Physics Gordon Research Conference, Mt. Snow Resort, VT, June 26 – July 1, 2011.
28. “Precise atomic beam measurement of the Stark shift within the $5P_{1/2} \rightarrow 6S_{1/2}$ transition in ^{115}In ” Gambhir Ranjit, **A. Lorenzo '11**, and P.K. Majumder. *contributed poster*, APS Division of Atomic, Molecular, and Optical Physics Meeting, Atlanta, GA, June 13-17, 2011.
27. “Precise measurements of hyperfine structure and atomic polarizability in indium and thallium using two-color diode laser spectroscopy” P. K. Majumder, **Huajie Cao '08**, **Scott Smedinghoff '09**, and M. Gunawardena, *contributed poster*, APS Division of Atomic, Molecular, and Optical Physics Meeting, Williamsburg, VA, May 19-23, 2009.
26. “Precise measurement of the hyperfine splittings within the $6p_{3/2}$ level of atomic indium using two-color diode laser spectroscopy.” M. Gunawardena, **Huajie Cao '09**, **P.W. Hess '08**, and P.K. Majumder, *contributed talk*, APS Division of Atomic, Molecular, and Optical Physics Meeting, Williamsburg, VA, May 19-23, 2009.
25. “Precise measurements of hyperfine structure and atomic polarizability in indium and thallium”, P. K. Majumder, **P.W. Hess '08**, M. Gunawardena, *contributed poster*, International Conference on Atomic Physics, Storrs, CT, July 2008.
24. “Precise measurement of the hyperfine splittings within the $6P_{3/2}$ level of atomic indium using two-color diode laser spectroscopy” **P.W. Hess '08**, M. Gunawardena, and P.K. Majumder. . [Invited talk selected competitively for DAMOP ‘undergraduate research’ session] APS Division of Atomic, Molecular, and Optical Physics Meeting, State College, PA, May 2008.
23. “Precise measurements of hyperfine structure and atomic polarizability in indium and thallium using two-color diode laser spectroscopy”, **P.W. Hess '08**, **J. Strait '07**, M. Gunawardena, P.K. Majumder, *contributed poster*, APS Division of Atomic, Molecular, and Optical Physics Meeting, State College, PA, May 2008.
22. “High precision two-step spectroscopy in atomic indium” P.K. Majumder, M. Gunawardena, **O. Simpson '07**, **J. Strait '07**, and **P. Hess '08**, , *contributed poster* - Gordon Research Conference in Atomic Physics, Tilton, NH. June 27-July 1, 2007.
21. “Atomic structure measurements and tests of fundamental symmetries in a thallium atomic beam”, P.K. Majumder, **D. Butts '06**, R. Uhl. . Contributed poster, APS Division of Atomic, Molecular, and Optical Physics Meeting, , Knoxville, TN May 16-20, 2006.

20. “Differential Phase Shift Spectroscopy in a Thallium Atomic Beam”, P.K. Majumder, **D.Butts '06, J.A. Kerckhoff '05**, and R.Uhl. Contributed talk, APS Division of Atomic, Molecular, and Optical Physics Meeting, , Knoxville, TN May 16-20, 2006
19. “High-precision phase shift spectroscopy of the weak 1283 nm M1 transition in a thallium atomic beam”, P.K. Majumder, **C.D. Bruzewicz '05, J.A. Kerckhoff '05**, and R. Uhl., *contributed poster*: Atomic Physics Gordon conference, Tilton, NH 6/25-6/29 2005.
18. “High-precision phase shift spectroscopy of the weak 1283 nm M1 transition in a thallium atomic beam”, R. Uhl, **C.D. Bruzewicz '05, J.A. Kerckhoff '05** and P.K. Majumder, *contributed poster*: APS Division of Atomic, Molecular, and Optical Physics Meeting, Lincoln, NE, 5/22-5/25 2005.
17. “Search for long-range T-odd, P-even forces in atomic thallium”, P.K. Majumder, **J.A. Backusmayes '05, C.D. Bruzewicz '05** and R. Uhl, *contributed poster*: APS Division of Atomic, Molecular, and Optical Physics Meeting, Tucson, AZ, 5/25-5/29 2004.
16. “High-precision atomic structure measurements in thallium”, **M.A. Burkhardt '04, C.D. Holmes '03**, R. Uhl, and P.K. Majumder , *contributed poster*: APS Division of Atomic, Molecular, and Optical Physics Meeting, Tucson, AZ, 5/25-5/29 2004.
15. “Atomic Structure Measurements and Fundamental Symmetry Tests in a Thallium Atomic Beam”, **C.D. Holmes '03**, M.A. Green, and P.K. Majumder , *contributed poster*: APS Division of Atomic, Molecular, and Optical Physics Meeting, Boulder, CO, 5/29-6/1 2003.
14. “Atomic Structure Measurements and Fundamental Symmetry Tests in a Thallium Atomic Beam”, P.K. Majumder and **S.C. Doret '02** , *contributed poster*: APS Division of Atomic, Molecular, and Optical Physics Meeting, Williamsburg, VA, 5/29-6/1 2002.
13. “Precise Measurement of the Stark Shift in the Thallium $6P_{1/2} - 7S_{1/2}$ 378 nm Transition”, **S.C. Doret '02**. [Invited talk selected competitively for DAMOP ‘undergraduate research’ session] APS Division of Atomic, Molecular, and Optical Physics Meeting, Williamsburg, VA, 5/29-6/1 2002.
12. “Atomic Beam Spectroscopy and Test of Tim-Reversal Symmetry in the Thallium $6P_{1/2} - 6P_{3/2}$ M1 Transition”, P.K. Majumder, **S.C. Doret '02, C.D. Holmes '03**, and D.S. Richardson. *contributed poster*. 18th International Conference on Atomic Physics, Cambridge, MA, 7/28-8/2 2002.
11. “New Measurement of the Stark Shift in the Thallium $6P_{1/2} - 7S_{1/2}$ 378 nm Transition”, **S.C. Doret '02, P.D. Friedberg '01, A.J. Speck '00**, D.S. Richardson, and P.K. Majumder. *contributed poster*. 18th International Conference on Atomic Physics, Cambridge, MA, 7/28-8/2 2002.
10. “Precise Atomic Beam Spectroscopy Measurements in Thallium”, D.S. Richardson, **P.D. Friedberg '01**, P.K. Majumder, *contributed poster*: DAMOP 2001 Meeting, London, Ontario, CA; May 16-19, 2001.
9. “Precise Atomic Structure Measurements in Thallium at 378 nm using a Frequency-doubled Diode Laser”, P.K. Majumder, **R.N. Lyman ('99), P.D. Friedberg ('01)**, and D.S. Richardson, *contributed talk*: DAMOP 2001 Meeting, London, Ontario, CA; May 16-19, 2001.
8. “Precise Atomic Beam Spectroscopy Measurements in Thallium”, D.S. Richardson, **P.D. Friedberg '01**, P.K. Majumder, *contributed poster*: Atomic Physics Gordon Conference, Williams College; June 16-20, 2001.
7. “Precise Atomic Structure Measurements in Thallium and Tests of Fundamental Symmetries”, P.K. Majumder, *invited talk*: Harvard University, ITAMP Workshop on “Tests of Fundamental Symmetries using Atoms and Molecules”, 30 Nov.-1 Dec 2001.

6. "Atomic Structure Measurements in Thallium using a 378 nm Frequency-doubled Diode Laser ", P.K. Majumder, **R.N. Lyman ('99)**, and D.S. Richardson, *contributed poster: 1999 APS Centennial Meeting*, Atlanta, GA; March 20-26, 1999.
5. " Proposed Test of Long-Range T-Violating Forces in Atomic Thallium ", P.K. Majumder, *contributed poster: 1999 APS Centennial Meeting*, Atlanta, GA; March 20-26, 1999.
4. "Atomic Structure Measurements and Tests of Fundamental Symmetries within the Thallium $6P_{1/2} - 6P_{3/2}$ 1283 nm Transition", P.K. Majumder, **Leo L. Tsai ('98)**, and **P.C. Nicholas ('98)**. ICAP 16, Windsor, Ontario, Canada; 3-7 Aug. 1998. Appears in: 16th ICAP, Windsor, 1998 Contributed Abstracts.
3. "Precise Measurement of the Electric Quadrupole Amplitude within the 1.283 nm line of Atomic Thallium", P.K. Majumder and **Leo L. Tsai ('98)**. Contributed paper: DAMOP annual meeting, Santa Fe, NM; 27-30 May, 1998.
2. "Atomic Structure and Fundamental Symmetry Measurements in a Thallium Atomic Beam" P.K. Majumder and **Peter C. Nicholas ('98)**. Contributed paper: DAMOP annual meeting, Santa Fe, NM; 27-30 May, 1998.
1. "Precise Measurements of Electric Quadrupole and Dipole Amplitudes in Atomic Thallium," P.K. Majumder. Contributed paper: DAMOP annual meeting, Wash. DC; 18-21 April, 1997

VIII. JOURNAL PUBLICATIONS [undergraduate student co-authors in bold]:

18. " Measurement of the scalar polarizability of the indium $6p_{1/2}$ state using two-step atomic-beam spectroscopy", **Benjamin L. Augenbraun '15**, **Allison Carter '16**, P.M. Rupasinghe, and P.K. Majumder, *Phys Rev. A* 94, 022515 (2016).
17. " Measurement of $7p_{1/2}$ -state hyperfine structure and $7s_{1/2}$ - $7p_{1/2}$ transition isotope shift in ^{203}Tl and ^{205}Tl ", G. Ranjit, **D. Kealfhofer '13**, **G.D. Vukasin '14**, and P.K. Majumder, *Phys Rev. A* 89, 012511 (2014). [*Editors' choice*]
16. " Thallium $7p$ lifetimes derived from experiment and *ab initio* calculations of scalar polarizabilities", M.S. Safronova and P.K. Majumder, *Phys. Rev. A* 87, 042502 (2013).
15. " Measurement of the scalar polarizability within the $5P_{1/2}$ - $6S_{1/2}$ 410-nm transition in atomic indium", G. Ranjit, **N.A. Schine '13**, **A.T. Lorenzo '11**, **A.E. Schneider '12**, and P.K. Majumder, *Phys. Rev. A* 87, 032506 (2013).
14. " Measurement of hyperfine structure within the $6P_{3/2}$ excited state of ^{115}In ", Mevan Gunawardena, **Huajie Cao '09**, **Paul W. Hess '08**, and P.K. Majumder, *Phys. Rev. A* 80, 032519 (2009).
13. " A frequency stabilization technique for diode lasers based on frequency-shifted beams from an acousto-optic modulator ", Mevan Gunawardena, **Paul W. Hess '08**, **Jared Strait '07**, and P.K. Majumder, *Rev. Sci. Instrum.* 79, 103110 (2008).
12. "A frequency stabilization method for diode lasers utilizing low-field Faraday polarimetry", **J.A. Kerckhoff '05**, **C.D. Bruzewicz '05**, R. Uhl, and P.K. Majumder, *Rev. Sci. Instrum.*, **76**, 093108 (2005).

11. "Measurement of the Stark Shift within the $6P_{1/2} - 7S_{1/2}$ 378 nm Transition in Atomic Thallium", **S.C. Doret '02, P.D. Friedberg '01, A.J. Speck '00**, D.S. Richardson, and P.K. Majumder, *Phys. Rev. A* **66**, 052504 (2002).
10. "Hyperfine splitting and isotope shift measurements within the 378 nm $6P_{1/2} - 7S_{1/2}$ transition in ^{203}Tl and ^{205}Tl ," D.S. Richardson, **R.N. Lyman ('99)**, and P.K. Majumder, *Phys. Rev. A* **62**, 012510 (2000).
9. "Measurement of the electric quadrupole amplitude within the 1283 nm $6P_{1/2} - 6P_{3/2}$ transition in atomic thallium," P.K. Majumder and **Leo L. Tsai ('98)**, *Phys. Rev. A* **60**, 267 (1999).
8. "Optical-rotation technique used for high-precision measurement of parity nonconservation in atomic lead," D.M. Meekhof, P.A. Vetter, P.K. Majumder, S.K. Lamoreaux, and E.N. Fortson, *Phys. Rev. A* **52**, 1895 (1995).
7. "High-Precision Measurements of Atomic Parity Nonconservation in Lead and Thallium," P.K. Majumder, *Proc. 5th Int. Conf. Intersec. Nucl. Part. Phys.*, edited by S.J. Seestrom, AIP Press, NY (1995).
6. "Precise Test of Electroweak Theory from a Measurement of Parity Nonconservation in Atomic Thallium," P. Vetter, D.M. Meekhof, P.K. Majumder, S.K. Lamoreaux, and E.N. Fortson, *Phys. Rev. Lett.* **74**, 2658 (1995).
5. "High-Precision Measurement of Parity Nonconserving Optical Rotation in Atomic Lead," D.M. Meekhof, P. Vetter, P.K. Majumder, S.K. Lamoreaux, and E.N. Fortson, *Phys. Rev. Lett.* **71**, 3442 (1993).
4. "Search for a Coupling of the Earth's Gravitational Field to Nuclear Spins in Atomic Mercury," B.J. Venema, P.K. Majumder, S.K. Lamoreaux, B.R. Heckel, and E.N. Fortson, *Phys. Rev. Lett.* **68**, 135 (1992).
3. "Test of the Linearity of Quantum Mechanics using Optically Pumped ^{201}Hg ," P.K. Majumder, B.J. Venema, S.K. Lamoreaux, B.R. Heckel, and E.N. Fortson, *Phys. Rev. Lett.* **65**, 2931 (1990).
2. "New Test of QED from a Measurement of the $4^2S_{1/2} - 4^2F_{5/2}$ Three Photon Transition in He^+ ," P.K. Majumder and F.M. Pipkin, *Phys. Rev. Lett.* **63**, 372 (1989).
1. "Phase-Variation Technique for Measurement of the $n=2$ Lamb Shift in He^+ using Separated Oscillatory Fields," H.A. Klein, E.W. Hagley, P.K. Majumder, M.E. Poitzsch, and F.M. Pipkin, *Phys. Rev. A* **36**, 3494 (1987).

IX. RESEARCH TRAINING AND SUPERVISION

- 65 undergraduate research students supervised (1995-2017)
- 33 undergraduate senior honors theses supervised (1995-2017)

List of senior honors students, thesis titles, and current activities

2018

Bingyi Wang

“Polarizability and Transition Amplitude Measurements in Indium and Lead”
Applying fall '17 *Physics Ph.D. programs*

2017

Nathaniel Vilas

“Atomic beam measurement of the indium 7p polarizabilities using two-step atomic-beam spectroscopy”
Cambridge Univ, UK *Hershel Smith Fellowship (M.Phil. in physics)*
HARVARD UNIV. *Physics Ph.D. program*

Eli Hoenig

“Hyperfine structure and Isotope shift measurements in the $8p_{1/2}$ and $8p_{3/2}$ states of atomic thallium”
NIST/BOULDER *fiber laser development research group*

2016

Allison Carter

“Atomic beam measurement of the Stark shift in the In $6S_{1/2}$ - $7P_{1/2}$ transition using two-step spectroscopy”
U. MARYLAND / JQI *Physics Ph.D. program*

Sau-Man Cheng

“Hyperfine structure and Isotope shift measurements in the $8p_{1/2}$ and $8p_{3/2}$ states of atomic thallium”
U. COLORADO *Mech. Eng. Ph.D. program*

2015

Benjamin Augenbraun

“Atomic beam measurement of the Stark shift in the In $6S_{1/2}$ - $7P_{1/2}$ transition using two-step spectroscopy”
HARVARD UNIV. *Physics Ph.D. programs*
APS LeROY APKER AWARD WINNER - 2015

2014

Nathan Bricault

“Atomic beam measurement of the Stark shift in the In $6S_{1/2}$ - $7P_{1/2}$ transition using two-step spectroscopy”
CAMBRIDGE UNIV. *Machine Learning M. Phil. program*

Gabrielle Vukasin

“Hyperfine structure and isotope shift measurements of the $7P_{1/2}$ state of thallium using two-step laser spectroscopy”
TUFTS UNIV. *Mech Eng. M.S.*
STANFORD UNIV. *Mech. Eng. Ph.D. program*

2013

Nathan Schine “Precise measurement of Stark shift within the indium $5P_{1/2}$ - $6S_{1/2}$ transition at 410 nm”
U. CHICAGO *Physics Ph.D. program*
2013 Apker Award Finalist

David Kealhofer

“Hyperfine structure and isotope shift measurements of the $7P_{1/2}$ state of thallium using two-step laser spectroscopy”
U. C. SANTA BARBARA Physics Ph.D. program

2012

Anders Schneider “Precise measurement of Stark shift within the indium $5P_{1/2}$ - $6S_{1/2}$ transition at 410 nm”
U. PENN Comp. Sci. MS/Ph.D. program

Taryn Siegel

“Hyperfine structure and isotope shift measurements of the $7P_{1/2}$ state of thallium using two-step laser spectroscopy”
Epic Software Systems
JET Program (Teaching English in Japan)

2011

Antonio Lorenzo “Atomic beam measurement of the Stark shift in indium at 410 nm using FM spectroscopy”
U. ARIZONA Optical Sciences Ph.D.

2010

Anne O’Leary “Optical system development for high precision atomic beam spectroscopy of indium and thallium”
PRINCETON Geophysics Ph.D. program
UNIV. WASHINGTON postdoc in Ocean geochemistry
ST. OLAF COLLEGE Asst. prof. of physics and environmental science

2009

Huajie Cao “Precise measurement of the $6P_{3/2}$ hyperfine structure in ^{115}In using two-step diode laser spectroscopy”
PRINCETON Physics Ph.D.

2008

Paul Hess “Measurement of the indium $6P_{3/2}$ hyperfine structure using two-step excitation”
HARVARD Physics Ph.D. program (*group of Gabrielse/DeMille*)
JQI/University of Maryland postdoc (*group of C. Monroe*)
MIDDLEBURY COLLEGE Visiting Asst. Prof. of Physics

2007

Jared H. Strait “Vapor cell spectroscopy of Indium using a 410 nm diode laser system”
CORNELL UNIVERSITY Elec. Eng./Optics Ph.D. program
NIST, Gaithersburg NRC postdoc in laser science

Owen Simpson “Two-color spectroscopy of thallium and indium using two-tone RF spectroscopy”
PRINCETON UNIVERSITY Physics Ph.D, program

Toby E. Schneider “Precise phase shift spectroscopy in thallium using an in-vacuum ring cavity”
MIT/WOODS HOLE Mech./Ocean Eng. Ph.D.

2006

David Butts “Differential phase shift spectroscopy of the $6P_{1/2} \rightarrow 6P_{3/2}$ 1283 nm transition in atomic thallium”
MIT Aero./Astro. Eng. Ph.D. program
DRAPER LAB Staff Scientist

2005

Joseph A. Kerckhoff

“Measurement of a T-odd, P-even Interaction in the $6P_{1/2} - 6P_{3/2}$ 1283 nm Transition in Atomic Thallium”

STANFORD UNIVERSITY	Physics Ph.D. program (<i>group of H. Mabuchi</i>)
U. COLORADO/JILA	NRC postdoc (<i>group of K. Lehnert</i>)
HRL LABORATORIES	Research Scientist

Colin D. Bruzewicz

“Phase Shift Spectroscopy of the $6P_{1/2} - 6P_{3/2}$ M1 Transition in a Thallium Atomic Beam”

YALE UNIVERSITY	Physics Ph.D. program (<i>group of D. DeMille</i>)
LINCOLN LABS	Research Scientist

2004

Mark A. Burkhardt

“Measuring the two-step $6P_{1/2} \rightarrow 7S_{1/2} \rightarrow 7P_{1/2}$ 378 nm / 1301 nm transition in atomic thallium”

STANFORD UNIVERSITY	Physics Ph.D. program (<i>group of J. Stohr</i>)
HITACHI CORP.	

2003

Christopher D. Holmes

“Frequency modulation spectroscopy of the forbidden M1/E2 1283 nm transition in thallium”

HARVARD UNIVERSITY	Atmospheric Sci. Ph.D. program
U.C. IRVINE	postdoc
FLORIDA ST. UNIV.	Asst. Professor of Earth, Ocean, and Atmos. Sci.

2002

S. Charles Doret

“A Precise Measurement of the Stark shift in the Thallium $6P_{1/2} - 7S_{1/2}$ 378 nm Transition”

HARVARD UNIVERSITY	Physics Ph.D. (2009) (<i>group of J. Doyle</i>)
GTRI	Postdoc
WILLIAMS COLLEGE	Asst. Professor

APS LeROY APKER AWARD WINNER - 2002

2001

Paul D. Friedberg “Measuring the Stark shift in the $6P_{1/2} - 7S_{1/2}$ 378 nm Transition in Atomic Thallium”

U.C. BERKELEY	Elec. Eng. Ph.D. program
SYNOPSIS, INC.	Applications Engineer

2000

Andrew J. Speck “Measuring the Stark shift in the Thallium $6P_{1/2} - 7S_{1/2}$ 378 nm Transition”

HARVARD UNIVERSITY	Physics Ph.D. (2005) (<i>group of G. Gabrielse</i>)
ROWLAND INST./HARVARD	Junior Fellow (2005 - 2011)
SCHLUMBERGER	Research Scientist

1999

Robert N. Lyman " Precise Spectroscopy of the Thallium $6P_{1/2} - 7S_{1/2}$ 378 nm Transition "

U. WASHINGTON

M.S. in physics (2001)

U. VIRGINIA

Law school

1998

Leo L. Tsai

" Precise measurement of the electric quadrupole amplitude in the $6P_{1/2} - 6P_{3/2}$ transition of atomic thallium"

HARVARD/MIT

M.D./Ph.D. (2008) (*group of R. Walsworth*)

BETH ISRAEL HOSPITAL

Staff Radiologist

Peter C. Nicholas, " Design and construction of an atomic beam for precise spectroscopy of thallium"

U.N.C.

M.D./Ph.D. (2008) (medical imaging research)

DUKE UNIV MED SCHOOL

Ophthalmology Fellowship

1997

Julie R. Rapoport, " The Design, Construction, and Application of an Atomic Beam Apparatus"

NORTHWESTERN U.

Materials/Civil Eng. Ph.D. (2003)

EXPONENT, INC.

Engineering consulting firm (2004 -)

CALSTAR, INC.

Chief Scientist and V.P.

1996

Kyle F. Downey

" An atom-laser interaction region and electromagnetic structure measurements in atomic thallium"

SELF-EMPLOYED

Computer programmer/consultant

Paul F. Boerner,

" Construction of an optical system for use in precise measurements of thallium atomic structure"

STANFORD UNIVERSITY

Physics Ph.D. (2004) (*group of A. Walker*)

LOCKHEED MARTIN ADV. TECH. CENTER

Solar physicist

X. Postdoctoral Research Associates Supervised

Dr. David Richardson, Ph.D. U. Birmingham, UK

11/98 – 6/01

[currently: Faculty member at NW Missouri St. Univ.]

Dr. Michael Green, Ph.D. U. Adelaide, Aus.

11/02 – 12/03

[currently: research in medical physics imaging lab, Sydney Australia]

Dr. Ralph Uhl, Ph.D. Hohenheim Univ., Germany.

1/04 – 12/05

[currently: employed in technical R&D company, Frankfurt, Germany]

Dr. Mevan Gunawardena, Ph.D. Purdue Univ. 12/06 – 7/09
[currently: tenured faculty @ Stonehill College, N. Easton, MA]
Dr. Gambhir Ranjit, Ph.D. Old Dominion Univ. 1/11 – 9/13
[currently: Postdoctoral associate @ U. Nevada Reno Physics Dept.]
Dr. Priyanka Rupasinghe, Ph.D. Univ. of Oklahoma 1/15 – 8/17
[currently: tenure-track assistant prof. @ SUNY-Oswego]

XI. TEACHING EXPERIENCE

Williams College courses taught:

Physics 109 (Sound, Light, and Perception – non majors introductory course);
Physics 131-132 (Algebra-based mechanics, E&M, waves, modern physics + labs);
Physics 141 (Calculus-based mechanics + labs);
Physics 151 (Modern Physics + labs);
Physics 201 (Electricity and Magnetism + labs);
Physics 202 (Waves and Optics + labs);
Physics 301 (Introductory Quantum Mechanics + modern physics lab);
Physics 302 (Thermal and Statistical Physics);
Physics 402T (Advanced Quantum Mechanics tutorial).
1 month ‘Winter Study’ courses in Holography; Electronics; Musical Sound.

Univ. of Washington, Research Assoc. and Res. Asst. Professor (1989 - 1994)

While atomic physics research associate, worked with Prof. Lillian McDermott and the UW Physics Education Group during development of introductory physics "tutorials" (now published as Physics By Inquiry, JW Wiley, 1996, and Tutorials in Introductory Physics, Prentice Hall, 1997).