David Mackay

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Education

PhD in Material Science and Engineering

Washington State University January 2012-May 2016 (estimated date)

Specialty: Battery and Electrodeposition systems

- Learned battery control systems and electroplating procedures to fabricate tin nanoneedle anodes for Lithium ion batteries.
- Setup and maintained battery and electroplating facilities at WSU for fabricating and testing the batteries.
- Setup battery testing profiles and electroplating procedures to test the viability of the tin nanoneedle anodes.
- Authored a manuscript in Journal of Material Science regarding tin nanoneedle battery research and am on three patents on the same battery technology.
- Taught labs, graded homework, and answered questions regarding material as a teaching assistant for MSE 302, electric and magnetic properties of materials, and ME 220, Mechanics of materials lab.
- Co-authored four manuscripts with one as the first author on research on the optical properties of YAG (Yttrium Aluminum Garnet).
- Acquired knowledge of oscilloscopes, temperature control systems, positron spectroscopy, photoluminescence systems, and how to work with radioactive materials, C programming, and Origin software.

Bachelor of Sciences December 2011

Washington State University

Major: Physics Minor: Math Cumulative GPA: 3.43

Work Experience

Tutor-Etutoring.org Aug 2011-current

Tutor of chemistry, math, and physics.

- Explained difficult concepts and assisted students in solving physics, chemistry, or math problems.
- Reported any problems with the site to the director so that they could be fixed.

Contract Science Editor-Accdon LLC Feb 2014-current

- Edited academic manuscripts to review their writing quality.
- Reviewed their scientific quality and provided comments to improve their manuscript.

Volunteer Manuscript Reviewer Jan 2012-current

Journal of Materials Science
Electrochemical Society Journals
Wiley-VCH Journals

- Reviewed the scientific and written quality of various submissions to the journals and gave a recommendation of whether the journal should accept or reject the manuscript.

Voluntary service

Awarded the Eagle Scout Award June 2006
Taught difficult religious concepts to individuals
of various backgrounds and intellects.
Church of Jesus Christ of Latter day Saints
Pennsylvania and New Jersey July 2008 to August 2010

Journal Manuscripts

"Template-free electrochemical synthesis of tin nanostructures," David T. Mackay, Matthew T. Janish, Uttara Sahaym, Paul G. Kotula, Katherine L. Jungjohann, C. Barry Carter, M. Grant Norton J. Mat. Sci. 49, 1476-1483(2014).

"Lithiation of Tin Nanoneedles Investigated by in-situ TEM," Matthew T. Janish, David T. Mackay, Yang Liu, Katherine L. Jungjohann, C. Barry Carter, and M. Grant Norton Microsc. Microanal. 20 (Suppl 3), 1978-1979 (2014).

"Study of exciton dynamics in garnets by low temperature thermo-luminescence," D. T. Mackay, C. R. Varney, J. Buscher and F. A. Selim J. Appl. Phys. 112 , 023522 (2012).

"Strong visible and near infrared luminescence in undoped YAG single crystals," C. R. Varney, S. M. Reda, D. T. Mackay, M. C. Rowe and F. A. Selim AIP Advances 1 , 042170 (2011).

"Energy levels of exciton traps in yttrium aluminum garnet single crystals," C. R. Varney, D. T. Mackay, A. Pratt, S. M. Reda and F. A. Selim J. Appl. Phys. 111 , 063505 (2012).

"On the optical properties of undoped and rare-earth-doped yttrium aluminum garnet single crystals," C. R. Varney, D. T. Mackay, S. M. Reda and F. A. Selim,, J. Physics D: Applied Physics 45, 015103, (2012).

Patents

US-882732-01-US-REG- Tin Nanostructured Anodes for Lithium Batteries

US-882731-01-US-REG- Tin Nanostructured Anodes for Flexible Lithium Batteries

US-882730-01-US-REG- Nano-structured Alloy Anodes for Lithium Batteries

UNOFFICIAL ACADEMIC RECORD

Graduate

Name: **Mackay,David Thomas**
Student ID: **010932908**

Institution Info: Washington State University
Institution ID: 003800
Print Date: 02/04/2015

Degrees Awarded

Degree: BS in Physics
Confer Date: 12/17/2011
Plan: Major in Physics
Sub-Plan: Standard Option
Plan: Minor in Mathematics

Beginning of Graduate Record

2012 Spring Semester

Program: Materials Science and Eng, M.S
Plan: Master of Science in Materials Science and Engineering

Program: Materials Sci and Eng, Ph.D.
Plan: Doctor of Philosophy (Materials Science and Engineering)

Course		Description	Attempted	Earned	Grade	Points
MATSE	571	SURFACES	3.000	3.000	B+	9.900
MATSE	593	SEMINAR	1.000	1.000	A	4.000
MATSE	800	DOCT DISS EX	11.000	11.000	S	0.000
MSE	517	THIN FILMS	3.000	3.000	B+	9.900

			Attempted	Earned	GPA Units	Points
Term GPA	3.400	Term Totals	18.000	18.000	7.000	23.800
Transfer Term GPA		Transfer Totals	0.000	0.000	0.000	0.000
Combined GPA	3.400	Comb Totals	18.000	18.000	7.000	23.800

			Attempted	Earned	GPA Units	Points
Cum GPA	3.400	Cum Totals	18.000	18.000	7.000	23.800
Transfer Cum GPA		Transfer Totals	0.000	0.000	0.000	0.000
Combined Cum GPA	3.400	Comb Totals	18.000	18.000	7.000	23.800

2012 Fall Semester

Program: Materials Science and Eng, M.S
Plan: Master of Science in Materials Science and Engineering

Program: Materials Sci and Eng, Ph.D.
Plan: Doctor of Philosophy (Materials Science and Engineering)

Course		Description	Attempted	Earned	Grade	Points
CHEM	529	Topics in Analytical Chem	2.000	2.000	B	6.000
Course Topic:		Adv Sol Chem				
E_MIC	586	Projects Electron Microscopy	2.000	2.000	A	8.000
E_MIC	587	Topics in Electron Microscopy	1.000	1.000	S	0.000
MATSE	593	Seminar in Materials Science	1.000	1.000	A	4.000
MATSE	800	Doctoral Research, Diss, Exam	9.000	9.000	S	0.000
MSE	505	Advanced Materials Science	3.000	3.000	B+	9.900

			Attempted	Earned	GPA Units	Points
Term GPA	3.490	Term Totals	18.000	18.000	8.000	27.900
Transfer Term GPA		Transfer Totals	0.000	0.000	0.000	0.000
Combined GPA	3.490	Comb Totals	18.000	18.000	8.000	27.900

			Attempted	Earned	GPA Units	Points
Cum GPA	3.450	Cum Totals	36.000	36.000	15.000	51.700
Transfer Cum GPA		Transfer Totals	0.000	0.000	0.000	0.000
Combined Cum GPA	3.450	Comb Totals	36.000	36.000	15.000	51.700

Academic Standing Effective 12/18/2012: Good Standing

2013 Spring Semester

Program: Materials Science and Eng, M.S
Plan: Master of Science in Materials Science and Engineering

Course		Description	Attempted	Earned	Grade	Points
MATSE	593	Seminar in Materials Science	1.000	1.000	A	4.000
MATSE	800	Doctoral Research, Diss, Exam	11.000	11.000	S	0.000
ME	530	Elasticity	0.000	0.000	AU	0.000
Grading Basis:		Audit Only -- No Credit Given				
MSE	514	Thermodynamics of Solids	3.000	3.000	A	12.000

			Attempted	Earned	GPA Units	Points
Term GPA	4.000	Term Totals	15.000	15.000	4.000	16.000
Transfer Term GPA		Transfer Totals	0.000	0.000	0.000	0.000
Combined GPA	4.000	Comb Totals	15.000	15.000	4.000	16.000

			Attempted	Earned	GPA Units	Points
Cum GPA	3.560	Cum Totals	51.000	51.000	19.000	67.700
Transfer Cum GPA		Transfer Totals	0.000	0.000	0.000	0.000
Combined Cum GPA	3.560	Comb Totals	51.000	51.000	19.000	67.700

Academic Standing Effective 05/07/2013: Good Standing

UNOFFICIAL ACADEMIC RECORD

Graduate

Name: **Mackay,David Thomas**
Student ID: **010932908**

2013 Fall Semester
Program: Materials Sci and Eng, Ph.D.
Plan: Doctor of Philosophy (Materials Science and Engineering)

Course		Description	Attempted	Earned	Grade	Points
MATSE	593	Seminar in Materials Science	1.000	1.000	A	4.000
MATSE	800	Doctoral Research, Diss, Exam	11.000	11.000	S	0.000
MSE	515	Electronic Properties Material	3.000	3.000	B-	8.100
MSE	516	Phase Transformations	3.000	3.000	B	9.000

			Attempted	Earned	GPA Units	Points
Term GPA	3.010	Term Totals	18.000	18.000	7.000	21.100
Transfer Term GPA		Transfer Totals	0.000	0.000	0.000	0.000
Combined GPA	3.010	Comb Totals	18.000	18.000	7.000	21.100

			Attempted	Earned	GPA Units	Points
Cum GPA	3.420	Cum Totals	69.000	69.000	26.000	88.800
Transfer Cum GPA		Transfer Totals	0.000	0.000	0.000	0.000
Combined Cum GPA	3.420	Comb Totals	69.000	69.000	26.000	88.800

Academic Standing Effective 12/17/2013: Good Standing

2014 Spring Semester
Program: Materials Sci and Eng, Ph.D.
Plan: Doctor of Philosophy (Materials Science and Engineering)

Course		Description	Attempted	Earned	Grade	Points
MATSE	593	Seminar in Materials Science	1.000	1.000	A	4.000
MATSE	800	Doctoral Research, Diss, Exam	9.000	9.000	S	0.000

			Attempted	Earned	GPA Units	Points
Term GPA	4.000	Term Totals	10.000	10.000	1.000	4.000
Transfer Term GPA		Transfer Totals	0.000	0.000	0.000	0.000
Combined GPA	4.000	Comb Totals	10.000	10.000	1.000	4.000

			Attempted	Earned	GPA Units	Points
Cum GPA	3.440	Cum Totals	79.000	79.000	27.000	92.800
Transfer Cum GPA		Transfer Totals	0.000	0.000	0.000	0.000
Combined Cum GPA	3.440	Comb Totals	79.000	79.000	27.000	92.800

Academic Standing Effective 05/13/2014: Good Standing

2014 Fall Semester
Program: Materials Sci and Eng, Ph.D.
Plan: Doctor of Philosophy (Materials Science and Engineering)

Course		Description	Attempted	Earned	Grade	Points
MATSE	593	Seminar in Materials Science	1.000	1.000	A	4.000
MATSE	800	Doctoral Research, Diss, Exam	10.000	10.000	S	0.000

			Attempted	Earned	GPA Units	Points
Term GPA	4.000	Term Totals	11.000	11.000	1.000	4.000
Transfer Term GPA		Transfer Totals	0.000	0.000	0.000	0.000
Combined GPA	4.000	Comb Totals	11.000	11.000	1.000	4.000

			Attempted	Earned	GPA Units	Points
Cum GPA	3.460	Cum Totals	90.000	90.000	28.000	96.800
Transfer Cum GPA		Transfer Totals	0.000	0.000	0.000	0.000
Combined Cum GPA	3.460	Comb Totals	90.000	90.000	28.000	96.800

Academic Standing Effective 12/23/2014: Good Standing

2015 Spring Semester
Program: Materials Sci and Eng, Ph.D.
Plan: Doctor of Philosophy (Materials Science and Engineering)

Course		Description	Attempted	Earned	Grade	Points
MATSE	800	Doctoral Research, Diss, Exam	18.000	0.000		0.000

Graduate Career Totals

			Attempted	Earned	GPA Units	Points
Cum GPA:	3.460	Cum Totals	90.000	90.000	28.000	96.800
Transfer Cum GPA		Transfer Totals	0.000	0.000	0.000	0.000
Combined Cum GPA	3.460	Comb Totals	90.000	90.000	28.000	96.800

Non-Course Milestones

PRELIM FOR PH.D.
Status: Completed
Program: Materials Sci and Eng, Ph.D.
Date Completed: 11/19/2013
Milestone Level: Prelim Exam Doctor of Phil
Date Attempted: 11/19/2013 Completed
Exam Taken

End of Graduate

UNOFFICIAL ACADEMIC RECORD

Undergraduate

Name: **Mackay,David Thomas**
Student ID: **010932908**

Institution Info: Washington State University
Institution ID: 003800
Print Date: 02/04/2015

Degrees Awarded

Degree: BS in Physics
Confer Date: 12/17/2011
Plan: Major in Physics
Sub-Plan: Standard Option
Plan: Minor in Mathematics

Beginning of Undergraduate Record

2007 Fall Semester

Program: Physics, BS
Plan: Major in Physics
Subplan: Standard Option

Course		Description	Attempted	Earned	Grade	Points
CHEM	105	PRINCIPLES I	4.000	4.000	B	12.000
MATH	220	INT LIN ALG	2.000	2.000	A	8.000
MATH	273	CALCULUS III	2.000	2.000	A	8.000
PHYSICS	320	MECHANICS	3.000	3.000	A-	11.100
PHYSICS	341	ELEC & MAG	3.000	3.000	B+	9.900

			Attempted	Earned	GPA Units	Points
Term GPA	3.500	Term Totals	14.000	14.000	14.000	49.000
Transfer Term GPA		Transfer Totals	63.290	63.000	0.000	0.000
Combined GPA	3.500	Comb Totals	77.290	77.000	14.000	49.000

			Attempted	Earned	GPA Units	Points
Cum GPA	3.500	Cum Totals	14.000	14.000	14.000	49.000
Transfer Cum GPA		Transfer Totals	63.290	63.000	0.000	0.000
Combined Cum GPA	3.500	Comb Totals	77.290	77.000	14.000	49.000

2008 Spring Semester

Program: Physics, BS
Plan: Major in Physics
Subplan: Standard Option

Course		Description	Attempted	Earned	Grade	Points
CHEM	106	PRINCIPLS II	4.000	4.000	B	12.000
CPT_S	121	PROG DSN DEV	4.000	4.000	B+	13.200
PHYSICS	303	MODERN PHYS	3.000	3.000	B	9.000
PHYSICS	330	THERMAL PHYS	3.000	3.000	C+	6.900
PHYSICS	342	ELEC & MAG	3.000	3.000	B+	9.900

			Attempted	Earned	GPA Units	Points
Term GPA	3.000	Term Totals	17.000	17.000	17.000	51.000
Transfer Term GPA		Transfer Totals	0.000	0.000	0.000	0.000
Combined GPA	3.000	Comb Totals	17.000	17.000	17.000	51.000

			Attempted	Earned	GPA Units	Points
Cum GPA	3.230	Cum Totals	31.000	31.000	31.000	100.000
Transfer Cum GPA		Transfer Totals	63.290	63.000	0.000	0.000
Combined Cum GPA	3.230	Comb Totals	94.290	94.000	31.000	100.000

2010 Fall Semester

Program: Physics, BS
Plan: Major in Physics
Subplan: Standard Option

Course		Description	Attempted	Earned	Grade	Points
MATH	375	VECTR ANLYS	3.000	3.000	A-	11.100
MATH	440	APPL MATH I	3.000	3.000	A	12.000
PHYSICS	304	MODERN PHYS	3.000	3.000	B+	9.900
PHYSICS	443	OPTICS	3.000	3.000	C+	6.900
PHYSICS	499	SP PROBLEMS	2.000	2.000	S	0.000
PHYSICS	514	OPTELECTRON1	1.000	1.000	B	3.000

			Attempted	Earned	GPA Units	Points
Term GPA	3.300	Term Totals	15.000	15.000	13.000	42.900
Transfer Term GPA		Transfer Totals	0.000	0.000	0.000	0.000
Combined GPA	3.300	Comb Totals	15.000	15.000	13.000	42.900

			Attempted	Earned	GPA Units	Points
Cum GPA	3.250	Cum Totals	46.000	46.000	44.000	142.900
Transfer Cum GPA		Transfer Totals	63.290	63.000	0.000	0.000
Combined Cum GPA	3.250	Comb Totals	109.290	109.000	44.000	142.900

2011 Spring Semester

Program: Physics, BS
Plan: Major in Physics
Subplan: Standard Option

Course		Description	Attempted	Earned	Grade	Points
ASTRONOM	450	LIFE UNIVRSE	3.000	3.000	A-	11.100
MATH	301	MATH REASON	3.000	3.000	B+	9.900
PHYSICS	415	QUANTUM LAB	3.000	3.000	A-	11.100
PHYSICS	461	ATOMIC PHYS	3.000	3.000	B	9.000
PHYSICS	463	SOLID STATE	3.000	3.000	B-	8.100
PHYSICS	499	SP PROBLEMS	2.000	2.000	S	0.000

			Attempted	Earned	GPA Units	Points
Term GPA	3.280	Term Totals	17.000	17.000	15.000	49.200
Transfer Term GPA		Transfer Totals	0.000	0.000	0.000	0.000
Combined GPA	3.280	Comb Totals	17.000	17.000	15.000	49.200

			Attempted	Earned	GPA Units	Points
Cum GPA	3.260	Cum Totals	63.000	63.000	59.000	192.100
Transfer Cum GPA		Transfer Totals	63.290	63.000	0.000	0.000
Combined Cum GPA	3.260	Comb Totals	126.290	126.000	59.000	192.100

WASHINGTON STATE UNIVERSITY

UNOFFICIAL ACADEMIC RECORD

Undergraduate

Name: **Mackay,David Thomas**
Student ID: **010932908**

2011 Fall Semester

Program: Physics, BS
Plan: Major in Physics
Subplan: Standard Option

Course		Description	Attempted	Earned	Grade	Points
ENGLISH	402	TECH/PRO WRT	3.000	3.000	A-	11.100
MSE	302	ELECT MATLS	3.000	3.000	A	12.000
PHYSICS	410	ELECTRONICS	3.000	3.000	A	12.000
PHYSICS	450	QUANT MECH	3.000	3.000	B	9.000
PHYSICS	466	BIOLGCAL PHY	3.000	3.000	B	9.000
PHYSICS	490	UG THESIS	1.000	1.000	B+	3.300
PHYSICS	499	SP PROBLEMS	1.000	1.000	S	0.000
UCOLLEGE	302	ADV WRIT TUT	1.000	1.000	S	0.000

			Attempted	Earned	GPA Units	Points
Term GPA	3.530	Term Totals	18.000	18.000	16.000	56.400
Transfer Term GPA		Transfer Totals	0.000	0.000	0.000	0.000
Combined GPA	3.530	Comb Totals	18.000	18.000	16.000	56.400

			Attempted	Earned	GPA Units	Points
Cum GPA	3.310	Cum Totals	81.000	81.000	75.000	248.500
Transfer Cum GPA		Transfer Totals	63.290	63.000	0.000	0.000
Combined Cum GPA	3.310	Comb Totals	144.290	144.000	75.000	248.500

Undergraduate Career Totals

			Attempted	Earned	GPA Units	Points
Cum GPA:	3.310	Cum Totals	81.000	81.000	75.000	248.500
Transfer Cum GPA		Transfer Totals	63.290	63.000	0.000	0.000
Combined Cum GPA	3.310	Comb Totals	144.290	144.000	75.000	248.500

Non-Course Milestones

Writing Portfolio
Status: Completed
Program: Physics, BS
Milestone Level: Pass

Transfer Credits

Transfer Credit from Columbia Basin College
Applied Toward Physics, BS

	Attempted
Transfer Totals:	63.29

End of Undergraduate