Moving Water (Jelaluddin Rumi, Coleman Barks translation)

When you do things from your soul, you feel a river moving in you, a joy.

When actions come from another section, the feeling disappears. Don't let

others lead you. They may be blind or, worse, vultures. Reach for the rope

of God. And what is that? Putting aside self-will. Because of willfulness

people sit in jail, the trapped bird's wings are tied, fish sizzle in the skillet.

The anger of police is willfulness. You've seen a magistrate inflict visible punishment. Now

see the invisible. If you could leave your selfishness, you would see how you've

been torturing your soul. We are born and live inside black water in a well.

How could we know what an open field of sunlight is? Don't insist on going where

you think you want to go. Ask the way to the spring. Your living pieces will form

a harmony. There is a moving palace that floats in the air with balconies and clear

water flowing through, infinity everywhere, yet contained under a single tent.

M.C. Escher, Waterfall

Minnesota Physics Graduate Program: Overview

Yuichi Kubota

18 August 2008

Schedule over 2 weeks

	Morning	Afternoon
Today	Introduction	Advising, course registration & reception (3:30pm)
19	GWE (9a-12n)	Ethics, Safety training,
20	GWE (9a-1pm)	TA orientation starts
21-29	TA orientation + where you can get help, etc.	

What questions do you want answered this morning?

Outline

- Cast
- Pre-academic Adviser
- Available resources in difficult times
- Foci of your life in physics
  - Research
  - Courses
  - Teaching
  - Others
- How to find info and help
- Expectations by year
- Statistics
- summary

Cast

- You
- Your peers and senior students.
  - Mentor TA's
  - Grad phi, WIPA
- Professors
  - Research and pre-academic advisers
  - Teachers of classes you take
  - Boss of classes you teach
- Judy Soine (my assistant – she can answer most of your questions)
- Julie Murphy (appointments, money, visa, …)
- Allen Goldman (head – anything big and important),
- Ken Heller (associate head – teaching related matters)
- Ginny Olson (administrator – keeps us out of trouble)
- Brian Andersson (TA scheduling)
- Sean Albiston (lab preparation, maintenance)
- Jim Kakalios (Director of Undergraduate Studies)
- Yuichi Kubota (DGS – your care taker, counselor …)

Pre-academic advisers

Campbell, Charles (348, 4-4141, campbell@umn.edu)

Michael Schecter (Wednesday; meet with Kubota on Monday at 2pm)

Cattell, Cynthia (316, 6-8918, cattell@fields.space.umn.edu)

Kristopher Kersten

Cushman, Priscilla (260G, 6-8917, prisca@physics.umn.edu)/Kubota, Yuichi (260H, 4-9582)

Nathaniel Pastika, Pamela Vo

Woods Halley (350C, 624-0395, woods@woods1.spa.umn.edu)

Ivan Fedorov

Ken Heller (260A, 624-7314, heller@physics.umn.edu)

Miranda Pihlaja, Qing Xu

Huang, Cheng-Cher (335, 4-0861, huang001@umn.edu) meet Tuesday (meet w/ Kubota on Monday, 2pm)

Chad Geppert, Joffrey Peters, Tianran Chen, Xin Zhang, Kent Bodurtha, Yan Yin

Pre-academic advisers

Kubota, Yuichi (260H, 4-9582, yk@physics.umn.edu, 1pm)

Ryo Namba, Adam Schreckenberger, Xiangwei Tang, Chen Hou, Alexey Finkel, Shanxu Shi, Chris West, Susan Gosse, Chaoyun Bao

Noireaux, Vincent (311, 4-6589, noireaux@umn.edu)

Kevin Christie, Molly Andreason

Vainshtein, Arkady (440, 6-0814, vainshte@umn.edu)

Sean Bartz, Sener Ozonder, Peter Koroteev

Pre-academic adviser

- Talk to him/her whenever you have questions about life in the department.
- They are all eager to help you solve any problems you may encounter and stay on track to your PhD.
- If you want a 2nd opinion, don't hesitate to talk to me.
- I hear
  - My students never show up after the first meeting.
  - My adviser is never available.

Pre-academic Adviser

- Meet with your (pre-academic) adviser this afternoon.
  - Make an appointment with him/her immediately, if you have not done so already
- Topics to cover.
  - Establish a good rapport.
  - Which classes are appropriate.
  - Good way(s) to find a research adviser to work with next summer
  - Assignment for the Wednesday orientation (see next slide)
- At the minimum, you need to talk to your adviser toward the end of the semester to talk about
  - How you have been doing over the semester,
  - What classes to take in the spring.
- If you have any problems, talk to him/her immediately.
  - Most problems get more complex, the longer you wait.
- If for some reason, you cannot find your adviser when you need (want) to, please see me (DGS).

One more thing w/ adviser

- To help us learn what physicists do, and what we need to do to be like a good physicist,
- Please talk with your adviser what s/he thinks
  - “thinking like physicists” means, and
  - how important “problem solving” is to her/his professional life as well as to live productively as a person.
- Write down what you learned so that you can participate in a discussion on Wednesday.

If you have any troubles,

- You should seek help.
  - Course work
    - Course level is not right
    - Professor is not helpful
    - His/her teaching style does not match with your learning style
    - Need better study habit
  - Teaching
    - Takes too much time
    - Teaching seminar is not helping
    - Trouble with students
    - Trouble with professor
  - Research
    - Conflict with adviser
  - Personal
    - Health
    - Emotional
    - Money
    - Social
  - Talk to
    - classmates
    - other TA in the same section, or other sections
    - Academic adviser
    - professor
    - DGS
    - Grievance committee
    - counselor

Mental problem?

- 20% of population has some difficulties of this nature. How many professors are suffering from it?
  - It's not unique to you, and getting help is a common practice in the US.
  - It's not a shameful thing to have an emotional problem, and it is perfectly OK to seek professional help with it.
  - Professionals can very often help you get better.

Helpful resources outside physics

- In case of difficulties in life, there are many resources you should be aware of outside the department whose responsibilities are to help students.
  - Ombudsman's office – Friday morning
  - UCCS (counseling, consulting) – Friday morning
  - Disability service
  - Boynton Health Center
- Many of these offices are coordinating and communicating with each other so if you are not sure which is the best, just go to one, and they will tell you where the best one is.

Things to do in graduate school

- Take courses (first 2-3 years)
- Teach discussion and lab sessions (~ 2 years)
- Pass written exam (GWE)
  - Given twice/year
  - Should pass by next summer
- Do research (3rd year on)
- Stay sane, have fun, connect w/ people

Specifically in the 1st year

- Course work (more on next slide)
- GWE (more on next slide)
  - Tomorrow/day after?
  - January 2008
  - August 2008
- Look for research adviser
  - Sell your strengths to secure a summer research position
  - Summer support is not guaranteed, though limited number of TA positions are available
- Do research in summer 2008
- If you have a more advanced background …

Classes

- Typical case
  - Have taken Quantum, Classical Phys (analytical mech, electrodynamics) and Thermodynamics/Stat. Mech. as undergrad
  - Fall – 5001 (Quantum), 5011 (analytical mechanics), 5201 (Thermo/Stat)
  - Spring – 5002, 5012 (electrodynamics), 4xxx (intro to xxxx)
  - Math method (5041) possible alternative to 5201
  - 5072 (phys education) is required to make sure you keep up with your teaching preparation
- If you did not take any of the above as undergrad, consider 4001/2, 4101, 4201, 4303 (waves, relativity), 4051 (electronics).
  - Could delay your research and PhD by one year
- If you feel you have mastered most of the materials for these courses, consider taking advance QM (8001), and other 8000-level courses of your interest.

Courses to consider in the first year

	Shop class
Physics 4051/2	Methods of Experimental Physics (electronics, exp project)
Physics 4101	Introduction to Quantum Mechanics
Physics 4201	Thermal/Statistical Physics
Physics 4211*	Introduction to Solid State Physics
Physics 4221*	Magnetism: Physics, Geophysics, and Engineering
Physics 4303	Waves, Optics, and Relativity
Physics 4311*	Introduction to Nuclear Physics
Physics 4411*	Introduction to Elementary Particles
Physics 4611*	Introduction to Space Physics
Physics 4621*	Introduction to Plasma Physics
Physics 4711*	Introduction to Optics
Physics 4811*	Introduction to Relativity and Cosmology
Physics 5001/2	Quantum Mechanics
Physics 5011/2	Classical Physics
Physics 5041/2	Analytic and Numerical Methods
Physics 5201	Thermal/Statistical Physics
Astronomy 4011	Stars and Stellar Evolution
Astronomy 4021	Galaxies and the Milky Way
Astronomy 4101	Computational Methods in the Physical Sciences
Astronomy 5012	The Interstellar Medium
Astronomy 5022	Relativity, Cosmology, and the Universe
Mathematics 4457/8	Methods of Applied Mathematics
Mathematics 4512	Differential Equations with Applications
Physics 5072	Teaching Introductory College Physics I and II

* Survey courses useful in deciding research specialties

More on classes

- A goal: GPA of core classes (5001/2, 5011/2, 5041, 5201) of 3.5.
- You can register for 14 credits every semester
  - Since you need 40 course credits to obtain PhD, to finish them in 2 years, you should take at least 10 credits.
  - More than 10 will allow you to finish earlier
  - Or you can take other “useful” classes.
    - Statistics, Biochemistry, Neuroscience, philosophy
    - GRAD 8101/2 future faculty development
    - Arts, music, sports, philosophy, …

GWE

- Should you take it tomorrow? (next slide)
- Given twice/year, and you have three opportunities to pass
- It covers undergraduate physics in a comprehensive manner and sophistication expected for graduate students
- If you have complete mastery of Freshman physics, you should be very close to passing, if not passing it.
- Passing level is about 50%.

Should you take GWE tomorrow?

- Should take it if
  - You plan to start doing research right away – have a master's degree and have taken most of the required courses already
- Should not take if
  - If you don't think you can take the impact of poor performance
- If you are confident that you will pass, there is no need to hurry though it may be nice to get over with it.
  - If you pass it with flying colors, congratulations, but still take coursework seriously.
  - If courses are easy, too, consider changing to higher-level classes
- If you think you have small chance to pass, I think it would be better if you study for a few months so that your level of understanding is significantly deeper than the bare minimum, and pass the winter one easily
  - Often doing TA is a good training for GWE.

Research

- What subfields are available here? (slide later)
- How to find field of your interest (slides later)
- When/how should you start
  - Look for research adviser in the spring 09
  - Try out research in the summer 09
  - Continue during year (09-10) at low level if you like it.
    - If you do really well in the summer, you may get RA during the year!
  - If not, find another adviser next spring 10.
  - Have final research adviser during the 2nd summer (10).
  - Pass Prelim. Oral Exam within ~ 6 months (by end of 2010)

We want you to be successful

- We want students who will be <u>successful in doing research and move on to research career</u>. This means that we expect that you
  - are interested in doing research
    - not about taking more difficult classes, though for some theory-oriented students, this may be relevant
  - are interested in the kind of physics our faculty members are interested in.
  - have reasonable communication ability, both in spoken and written, and also are interested in improving it.
  - are outgoing, at least some times, which will help improve the atmosphere of the department more.

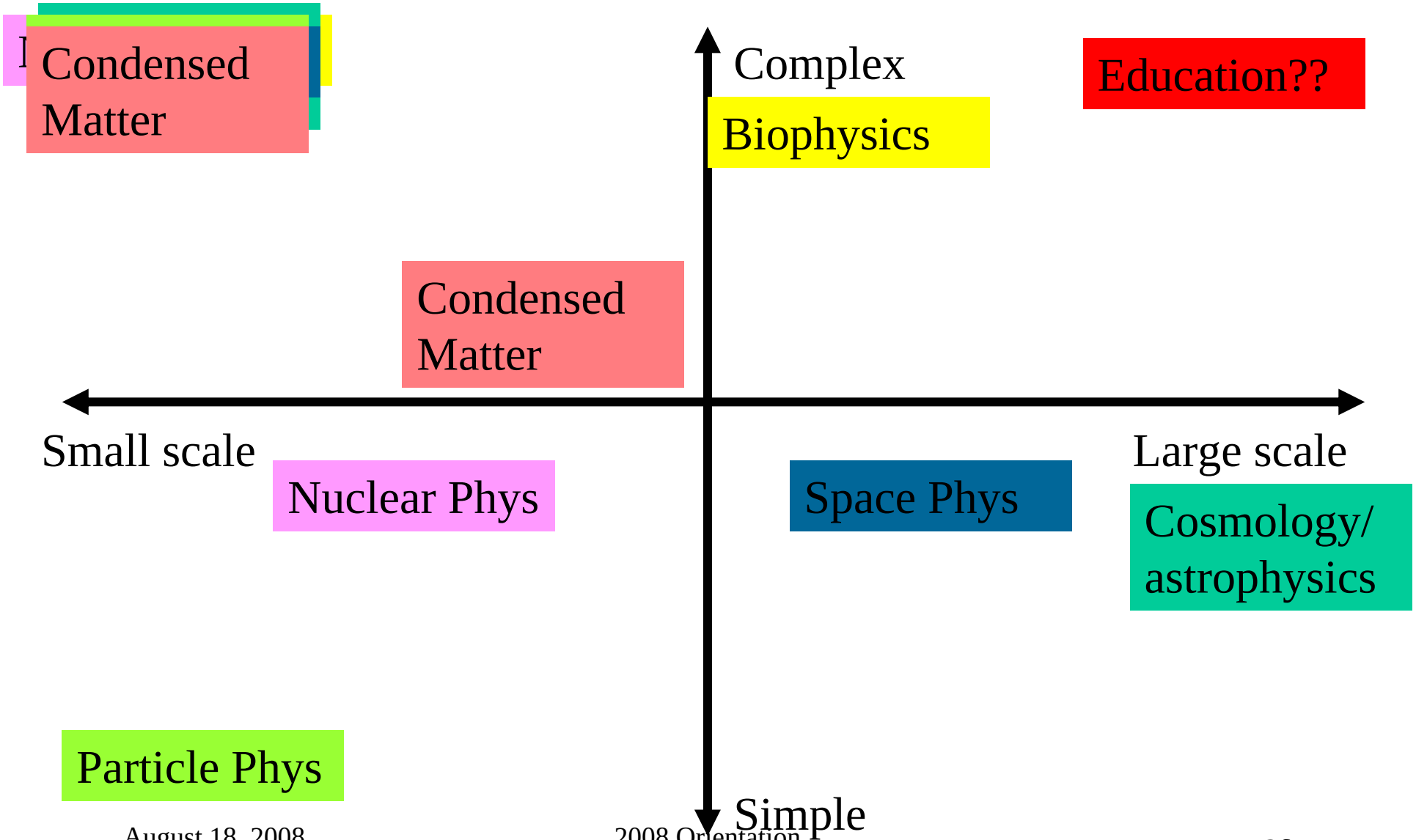
What does “Research” means

- You like to fool around with things to figure out how they work.
  - You used to fix your car, but now you want to work with something more fundamental (esoteric)
- You like to work on one-of-a-kind unique challenges, not the same thing over and over.
- You don’t mind spending endless hours to figure out things.
  - you don’t mind if you don’t get quick answers.

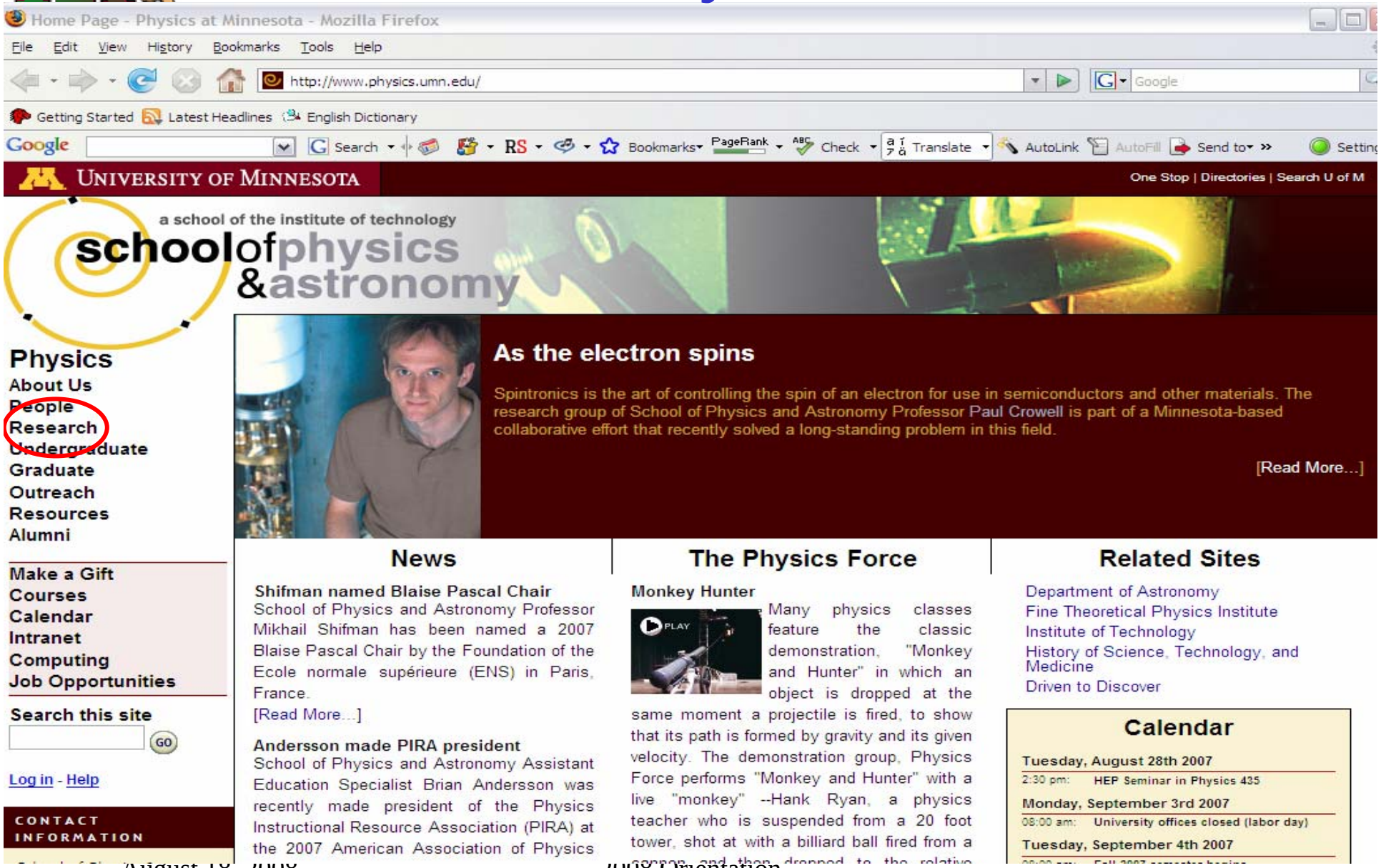
More on Research

- If you are eager to start doing research, go for it, and figure out how best to get there.
  - Finish taking classes ASAP
  - If you have enough time after taking care of course work (and TA work) dabble with a research group.
  - If you feel you are ready to do more research, ask for a fellowship to facilitate it.
- If you are not sure if you like doing research, figure it out as soon as possible.
  - Dabble with it whenever you can.
  - Utilize summer 2008 to figure this out.

Fields of research



Where do you start?



Biophysics, for example

Home > Research > Biological

Biological Physics

In biological physics, quantitative aspects and ideas and techniques of physics research are applied to biological problems. Physics has been evolving in the direction of studying more complex systems, and in doing so, has begun to expand its subject area to include living systems.

For example, Professor Joachim Mueller leads an experimental group who are studying the kinetic pathways that occur when proteins misassemble, a topic that has relevance in research on Alzheimer's disease. His lab features a novel approach to fluorescence fluctuation spectroscopy (a process where a fluorescent compound is injected into a cell and studied under a microscope) with the innovation of a high pressure cell that allows spectroscopy over a broad range of pressures.

Yan Chen a research associate in Joachim Mueller's group, performs fluorescent fluctuation spectroscopy.

Vincent Noireaux, experimentalist in biophysics, studies in vivo and in vitro gene expression, artificial cell, cytoskeleton and artificial motility.

Another experimentalist, John Broadhurst, analyzes signal processing in the human brain with a non-invasive technique known as magneto-encephalography, which measures activity in the audio cortex.

Theorists Boris Shklovskii and Alexander Grosberg are studying, among other things, charge inversion in DNA with a computer simulation of electrophoresis (the migration of charged molecules such as proteins in an electrical field).

Biophysics, for example

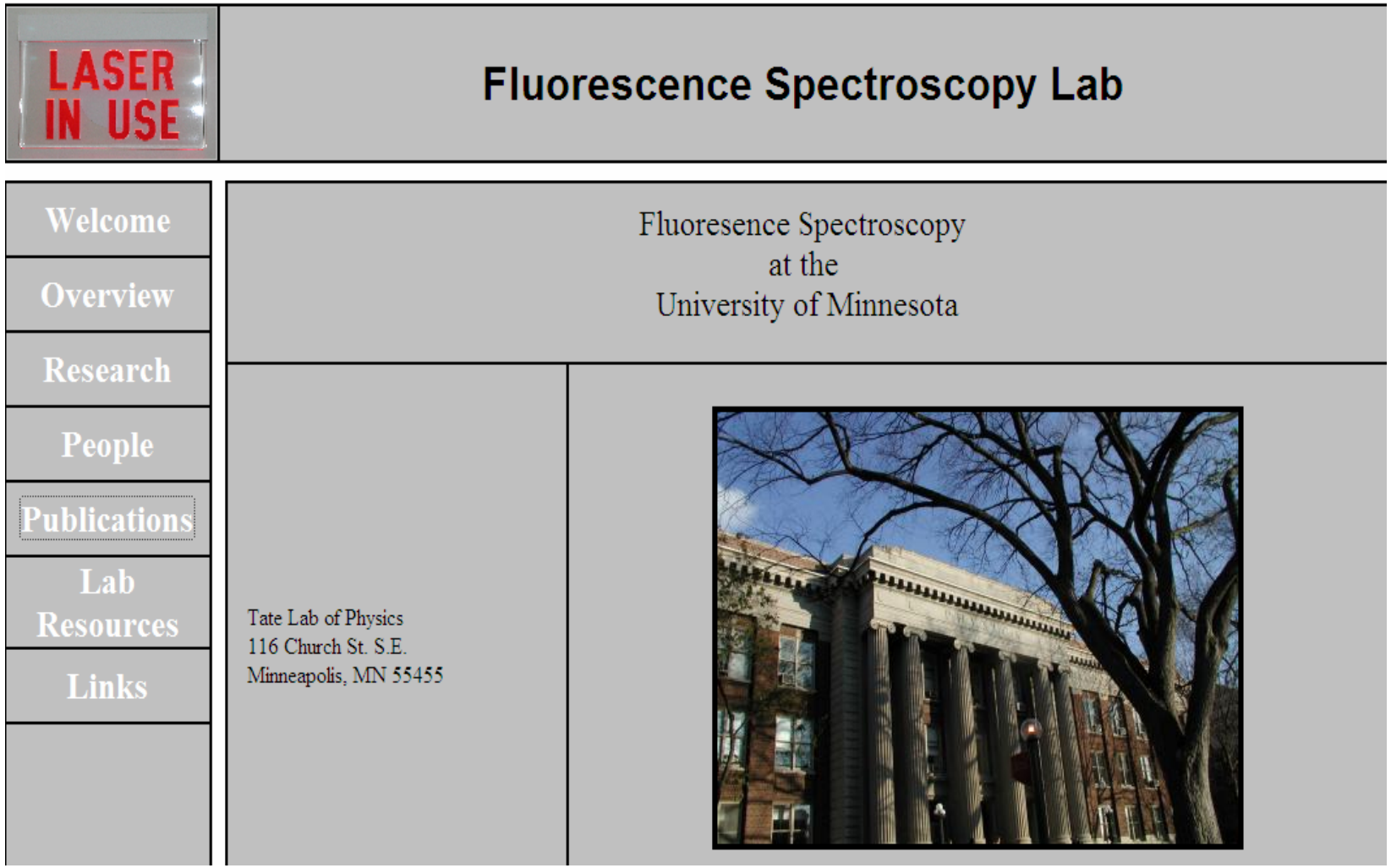
Biological Physics Faculty

John Broadhurst	
Alexander Grosberg	Theoretical physics of polymers and biopolymers, theoretical biophysics
Joachim Mueller	Experimental biophysics, two-photon excitation microscopy, fluorescence fluctuation spectroscopy
Vincent Noireaux	Experimental biophysics. In vivo and in vitro gene expression, artificial cell, cytoskeleton and artificial motility.
Boris Shklovskii	
Russell Hobbie (Emeritus)	

Related Links

- Mueller Group Home
- Biological Physics Home

Mueller's lab



Other tips on finding adviser

- Talk to professors, senior graduate students, postdocs
- Go to Graduate Research Seminar (5980)
  - take for credit if there is room
- Go to seminars and colloquia
- Read journals (PRL, PR, PL, RMP, Nature, Science, Scientific American, …), also Los Alamos e-archive
  - Space: J of Geophys. Res., GRL, Adv. Space Res.
  - Biophysics: Biophys. J., Nature cell. Bio., Polymer

More

- You may look for adviser outside the department
  - Some of them ARE physics Graduate Faculty already
    - Astronomy
      - Kris Davidson
      - Robert Gehrz
      - Roberta Humphrey
      - Thomas Jones
      - Terry Jones
      - Liliya Williams
    - Chemistry
      - Jiali Gao
    - Mechanical Engineering
      - Uwe Kortshagen
    - Chemical Engineering
      - David Morse
      - Chris Leighton
    - Electrical Engineering
      - Anand Gopitath
      - Randall Victora
      - Jianping Wang
    - Biochemistry, Molecular Biology & Biophysics
      - David Thomas
    - Biophysics/Medical Physics
      - Michael Garwood

As long as the research is “physics” like, other professors can be added to physics graduate faculty.

If you need info

- Handbooks:
  - http://www.grad.umn.edu/current_students/handbook/index.html
  - http://www.physics.umn.edu/grad/handbook/
- Course catalog
  - http://www.grad.umn.edu/catalog/index.html
- Ask:
  - Judy or Julie,
  - DGS
  - Graduate School staff

Info

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- GradPhi
- Handbook
- Related Links

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Make a Gift
Courses

Physics Grad Handbook

Introduction • New Students • 2nd+ Year • M.S. Degree • Ph.D. Degree • Policies • Printable PDF

1. Introduction

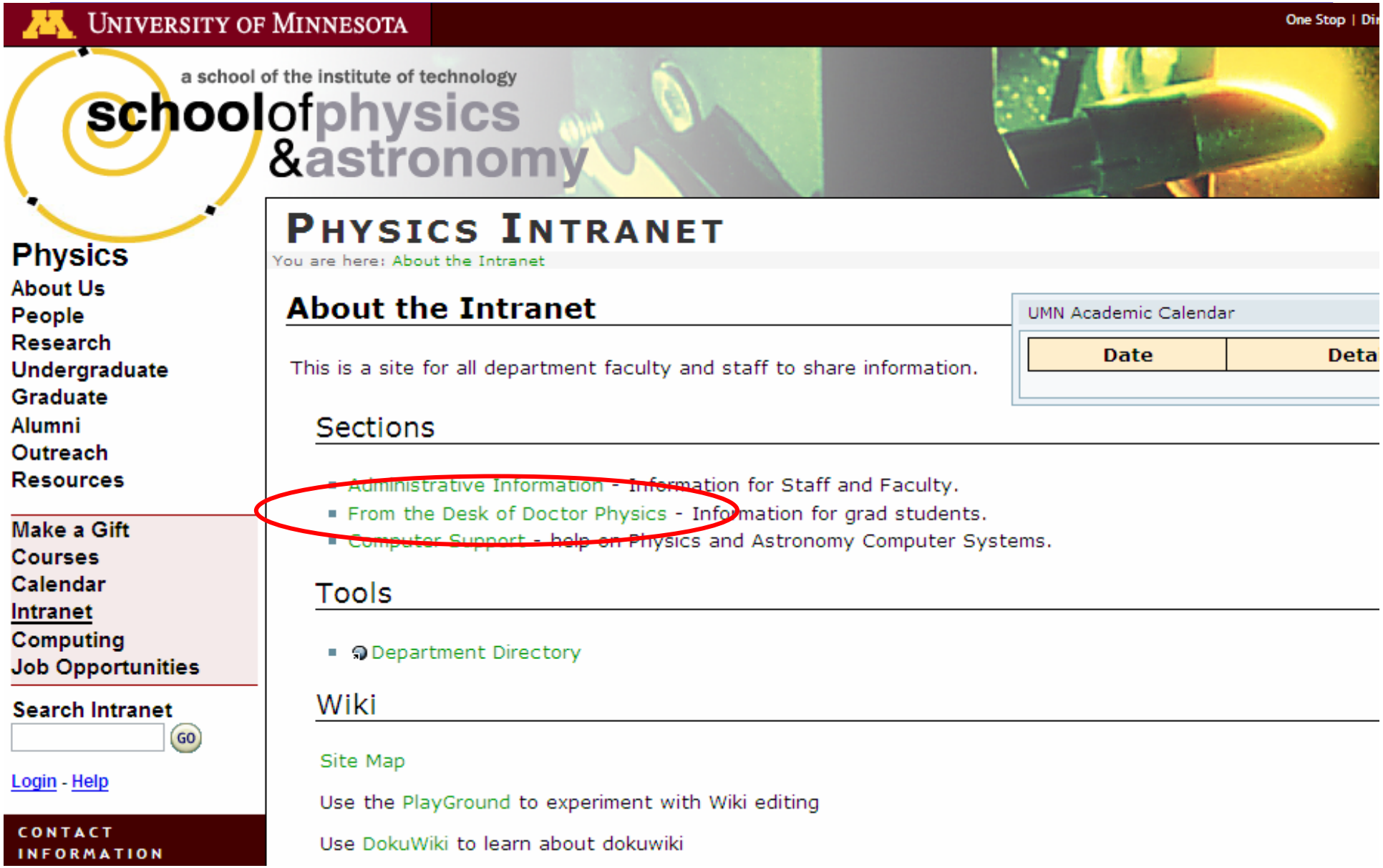
- The First Year
- The Second Year
- The Third and Later Years
- Tuition and Related Issues
- Departmental Activities
- Finding a Job
- The University Community
- Table 1.1: Outline of Physics Program Requirements

2. For New Students

- Orientation
- Courses
- Table 2.1: Sample schedules
- Table 2.2:Some Courses Taken By First Year Students
- The Graduate Written Examination
- Getting Started in Research

3. After the First Year

Info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PHYSICS INTRANET

You are here: About the Intranet » From the Desk of Dr. Physics

From the Desk of Dr. Physics

Here are a collection of tips, policies, etc. for our graduate students.

For current students

- Updates in the Students Handbook since 1999
- Preliminary Oral Exam Miscellany
- Solving personal problems and grievances
- Financial support for research-related travel.
- Doctor Physics' Course Catalog
- Classes you should take
- Ethics

Contents:

- Typical classes
- Doctor Physics
- Updates to Ha
- Housing Inform
- new_students
- Preliminary Ora
- Solving Person
- Departmental F Travel

Many of the pages are under construction, and are changing quite often. At this point, some of the links, for example, may not be working properly, yet.

Additional benefit of research in summer

- The stipend of ~$16k is paid over the academic year of 9 months.
- You get no pay over the summer unless you do something.
- If you get an RA position or a summer fellowship, you will get paid at the same rate as during the year.
- The rest will get a TA position over the summer, if they don't get a fellowship/RA position.
  - You will teach 1/4-time (1/2 of normal teaching), which leaves you with time to try out research, prepare for GWE, etc.
  - You will be paid 3/8-time (3/4 of normal pay – less than during the year)

Annual survey of progress

- Done every spring – due March 15.
  - What have you done well so far?
  - What can you and the department do to improve what you have not done as well as you wanted
- Opportunity for you to check your own progress and discuss it with your adviser (pre-academic or research)
- Opportunity for us to detect if anything unusual is happening to you
  - This is obviously a minimal check. It would be better if you check your own progress more often and check w/ me whenever you have questions
- In addition, you will be asked to come up with a summer research plan
  - With a reasonable research, many of you get fellowships over the summer of RA.

Next summer

- I hope you will say:
  - I have talked to many professors and graduate students, first years and older
  - I have research position with a fellowship.
  - Did well in courses (GPA > 3.5) and have ~24 credits
  - Passed GWE in winter, or at least has confidence in passing this summer

Individuals are different, however

- Depending on where you are now, you may want to be more or less ambitious
  - Your undergrad preparation level is somewhat less complete than others
  - You already have a Master's degree and have taken many of courses similar to 5000-level classes

2nd year

- Take the rest of the required courses (40 credits total)
  - including 8000-level courses (8 credits)
  - Start taking seminars (2 req'ed)?
  - Do some research if previous summer worked out well
  - Look for a new adviser if previous summer did not work out
  - If you have an advanced background, this may be your first-year agenda

Courses to take

- Most of you take 8001 (adv QM) – not Space?
- Consult w your research adviser
  - These are rough guidelines.
- The following courses may be taken in the first year if you have advance background

8311/2	Biophysics
8701/2	Stat Mech
8000	Seminar
8700	Seminar
8000	Seminar
8600	Seminar
8200	Seminar

Master's?

- For whatever reasons, if PhD is not for you, you probably want to obtain a Master's in 2nd year.
- If you don't pass GWE by summer 09, prepare to obtain a Master's degree as a back-up
  - Need an adviser
  - Plan A needs a project
  - Plan B requires paper(s) (120 hours worth of work)
  - w/ this prep, you can petition for 4th try on GWE

By 2nd summer

- Passed GWE (at least taken once for MS)
- Finished taking courses (except a few seminars)
  - Some of the theory students may be taking more classes in the 3rd year
- Started serious research (finished or almost finished, if MS)
- Getting ready to take Oral Exam
  - File "Program Degree" form – list all courses you have taken and plan to take
  - Demonstrate that you are ready to do research
- Annual survey will check these milestones

3rd year and later

- Oral Exam
- Do research
- Other things to do while doing your research
  - Thesis defense of other students
  - Seminars and colloquia
  - Conferences and workshops
  - Informal conversation with people in the department, related department, visitors
  - Read literature
- Thesis proposal
- Write papers and thesis

Annual survey of progress

- Filing of proper forms
  - Degree Program: within 6 months of starting research
  - Thesis Proposal: within 6 months of Oral to pin down what you have to do to finish your thesis research.
- Scheduled and passed Oral Exam in a timely manner?
- Is your expectation of what need to be done to be finished the same as your adviser's? If not, talk it over to come to some consensus.

ABD, who cares?

- All But Dissertation
- After passing Oral, and take 24 thesis credits (2 semesters), you will be ABD, which incurs smaller overhead cost for your adviser.
  - He is more willing to give you an RA position.
  - You may be able to get more Helium with that saving.
- While you take thesis credits, you have 4 extra credits you can take on other classes.
  - Seminar (2 are required for PhD)
  - Teaching class (GRAD 8101/02)
  - Courses taken after ABD may cost you real money

Requirements Summary

Requirements	M.S. (Plan A)	M.S. (Plan B)	Ph.D.
Total Credits Required (w/o thesis credits)	20	30	40
Thesis Credits	10	0	24
Major Courses Required	14 credits, including either 5001/2 or 5011/2 14 credits		Both 5001/2 and 5011/2, plus 2 seminar credits
Minor or Supporting* Program Credits	6 credits		12 credits
Minimum GPA	2.8		3.3
Time Limits	Not more than 7 years		Not more than 5 years after completing Preliminary Oral Exam
Transfer credits	Not more than 40% of program		No limit, must be approved by DGS

* Don't worry about this too much

Requirements continued

Requirements	M.S.		Ph.D.
Graduate Written Exam	Take once		Pass by Fall 2nd year
Preliminary Oral Exam	N/A		Pass by end of 3rd year
File Degree Program	After 10 credits		~6 months after start of research (after passing Graduate Written Exam
File Thesis Title/Proposal	Register thesis title when distributed to reviewers (plan A only)		after passing Preliminary Oral Exam
Final Oral Committee	3 members: 2 from major field, 1 from minor or related fields		5 members: 3 from major field, 1 from physics outside major field or from declared minor field, 1 from outside physics
Thesis reviewers	All members of oral committee	N/A	3 reviewers, including committee member from outside physics. Thesis must be approved one week before defense

Social aspects

- Grad Φ (∇Φ) graduate student organization was revived two years ago. Should provide good peer support to all students.
  - Social events inc. picnic
  - Conduit of useful information that professors and DGS are not aware of (or students don't want us to know!)
- WIPA (Women in Physics/Astro) has been going strong.
- SPS – equivalent organization for undergraduate + grad
- Sport teams
  - Soccer, softball, broomball, Ping-Pong, badminton
- Movie nights
  - "superhero" prof, prev. DGS, James Kakalios used to run it. Anyone interested in organizing movie nights?
- Any other ideas to make the atmosphere of department even better?

Why socializing/organizing?

- Better atmosphere in department helps students in difficulty
  - Easier to ask for help.
  - Easier to talk to people – many problems can be solved if someone is willing to listen to your problems.
  - Life is more fun and exciting if you share your success as well as failure with other people who care about you.
- Good to develop people and communication skills for your future
  - Are physicists good with people?
  - Should they be?
  - How can you make your future students to be productive and happy?
- What are organizing skills good for in your future?
  - Many of you will be working in a research group, and hopefully lead it.
  - They are expected to organize various events and conferences, coordinate grant applications, etc.

Some statistics

- Of 240 students who were here in 1998 or came afterward,
  - 96 got PhD
  - 69 left w/o PhD
    - ~50% got MS in physics before leaving
    - ~30% went to EE, Biochem, ME, etc in MN
  - 75 are here
- Median length of time to graduate = 5.7 years
  - 27% < 5 years
  - 66% < 6 years
- Time to graduate depends on external factors like
  - the scope of project,
  - funding approval,
- as well as factors you have a control over:
  - how hard you work and
  - how organized you are, etc.

After graduation?

- Recent graduates (since 1998)

faculty	26
Postdoc/staff	45
industry	29
Financial inst	6
Unknown	4

More on graduates (faculty)

Assistant Professor at UCLA
Prof in University of Utah
Assistant Professor at Johns Hopkins University
Asst prof at U Chicago
assistant prof at UC Riverside
Asst. Prof at U Virginia

Carlton assistant prof
UM Crookstone faculty (department head)
Winona State faculty (2)
Ast. Prof at UM Duluth
St. Johns U. assitant prof
U of St. Thomas
Wartburg College in Iowa
assistant professor at Marquette

assistant professor at University of Redlands (CA)
Assistant Professor at the California Polytechnic
Central Florida U asst prof,
Assistant Professor at Simmons College, Boston, MA
faculty at College of Holy Cross (MA)
Assistant Prof. at Rochester Institute of Technology

Aoyama Univ (Japan) prof
Senior Lecturer at the University of Cape Town, South Africa
Faculty in Korea
faculty (Middle East Technical Univ, Ankara, Turkey)
U Costa Rica

More on graduates (postdoc/staff)

UC Berkeley Space Science Lab
LBL
Argonne National Laboratory (5)
Fermi National Lab
LANL (2)
Naval Weapons Lab (2)
Goddard Space Flight Center
U Illinois at Chicago
Minnesota (4)
Rice U
UC Santa Barbara
U. Iowa
UCSF (med school)
UCSD (2)
UCLA
Arizona
Florida

Cornell
U Wisconsin
University of Winnipeg
Staff at Medical College of Wisconsin
UIUC
Penn State
Berkeley
UCSB (Chemistry)
Oxford
Cologne University (Germany)
U Chicago
U London
Heidelberg
Riken, Japan
Taiwan (2)

More on graduates (Industry)

Seagate (5)
General Electric
Imation
Senior Modeling Engineer @
    Polar Semiconductor Inc ,
    modeling device physics
Vice President of Digirad
software consultant (2)
Polar Fab Semiconductor
    Foundry
3M
Applied Materials Corp.

Raytheon Space and Airborne Systems
Northrup Grumann
Wright Patterson AFB
IBM (2)
General Atomics in San Diego
NVE, Inc
Intel Corp, Industrial R&D, process engineering (2)
medical facility in Cleveland
Science Advisor at Robins, Kaplan,
    Miller & Ciresi (Law Firm) (2)
programmer in Japan
Helping family business
research in industry

Any questions?

Summary

- You will be busy with
  - Taking courses
  - Teaching undergraduates
  - Doing research
  - Socializing and organizing yourselves
- Let's try to be balanced, seek for help while your trouble is manageable, and have fun and excitements with life.

Transferring credits:

- You can transfer credits for graduate courses taken at
  - another graduate institution, or
  - through the adult special program or University College (Extension) at the University of Minnesota,
- The official transfer of credits takes place when you submit your degree program form.
- Credits from another institution can be transferred as long as they are taken after you have received a bachelor's degree.
  - If you have attended college outside of the U.S., you can generally transfer credits earned after 4 years of post-secondary education. For example, some countries have a 5-year baccalaureate program. Generally, only courses from the 5th year of such a program can be transferred.
- Adult special students can only transfer courses from their 1st semester as an adult special student.
- A maximum of 12 credits earned in graduate courses taken through University College can be transferred.

Astronomy?

- Even though we are called “School of physics and astronomy”
- We are separate programs.
  - Share same building and some infrastructures
  - Separate budgets
  - Some professors have appointments in both
    - Roberta Humphreys, for example, is an astronomy professor but has a physics appointment so she can advise you.
    - If you want to do research w/ an astronomy professor, who does not have a physics appointment, you can ask her/him to get an appointment (this applies to professors in EE, CE, etc. as long as the research involves enough physics) more on this in slide 11