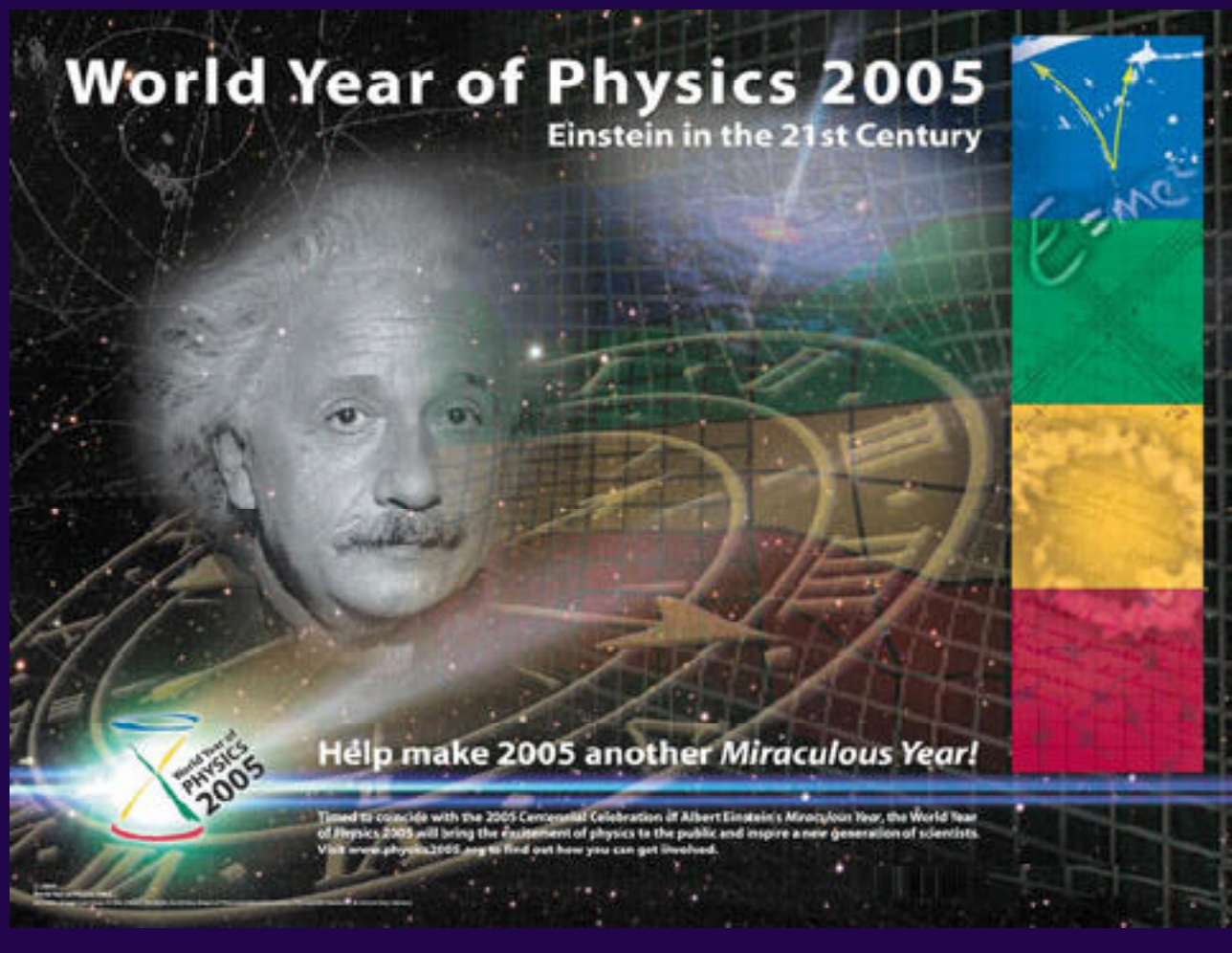


Physics Tracks

Newsletter of the Department of Physics
University of Notre Dame
Volume 2, No. 2



World Year of Physics 2005
Einstein in the 21st Century

Help make 2005 another *Miraculous Year!*

Timed to coincide with the 2005 Centennial Celebration of Albert Einstein's Miraculous Year, the World Year of Physics 2005 will bring the excitement of physics to the public and inspire a new generation of scientists. Visit www.physics2005.org to find out how you can get involved.

The poster features a central portrait of Albert Einstein, a rainbow, and a grid background. A vertical rainbow bar is on the right side. The text 'World Year of Physics 2005' is at the top left, and 'Einstein in the 21st Century' is below it. The phrase 'Help make 2005 another Miraculous Year!' is in the middle right. At the bottom left is a logo for 'World Year of Physics 2005'. At the bottom right is a small paragraph of text.

Letter from the Chair

Dear students, alumni, and other friends of the Physics Department at Notre Dame,

We have had an exhilarating year! 2005 is the **World Year of Physics** in a centennial celebration of Einstein's miraculous year and the Physics Department at Notre Dame has kicked off the year with a series of public lectures, workshops, and conferences. The new DeBartolo Center for Per-



forming Arts, the Snite Art Museum, the Center for Social Concerns, the Reilly Center for History and Philosophy of Science, the Music Department, and the Nanovic Institute for European Studies have all joined in various aspects of the celebration of world year of Physics! The Alumni Association has also decided to make **World Year of Physics** a theme for reunion weekend **June 3-5, 2005**. There will be a number of public lectures given by fac-

ulty of the department of Physics to alumni.

While we are forging ahead with our goals of increasing external funding for research, doubling the number of undergraduate physics majors, and raising the number of graduate students to over 100, we have also taken the time for introspection and self-evaluation.

In December, we invited the **Task Force for Undergraduate Education** to visit Notre Dame and to evaluate our Physics program for Undergraduates. This task force was the result of a study published in Physics Today in September of 2003 reporting on the characteristics of "thriving undergraduate Physics programs" in the country. We invited the task force to take a look at Notre Dame Physics. The report of the task force was very favorable of our program and encouraging of the changes that we have made in the undergraduate curriculum. In addition, it had 9 recommendations. I am happy to report that we have already implemented 6 of those 9 suggestions and we are working on the rest. We are also in the midst of evaluating our graduate curriculum in light of several national

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Ikaros I. Bigi



Ikaros Bigi is a particle physics theorist from the Max-Planck-Institut fuer Physik, Universitaet Munchen, Germany. He has been at Notre Dame since 1988.



The American Physical Society elected Professor Ikaros Bigi an APS Fellow. His citation read "for correctly predicting large CP violation in B meson decays." His research has focused on refining the standard model phenomenology for the decays of hadrons carrying the quantum numbers strangeness, charm and beauty and on electric dipole moments to use them as 'indirect' searches for 'new physics' like supersymmetry. In unguarded moments Prof. Bigi is thinking about limitations to quantum mechanics and worlds with more than one time dimension.

Malgorzata Dobrowolska



Malgorzata Dobrowolska is a condensed matter experimentalist from the Institute of Physics, Polish Academy of Sciences, Warsaw, Poland. She joined the faculty at Notre Dame in 1989.



Professor Malgorzata (Margaret) Dobrowolska was elected an APS Fellow for "her seminal contributions to the understanding of the role of electron spin in optical transition in semiconductor compounds." Most recently, her research interests have focused on structures in which some of the layers are magnetic which also affords the possibility of investigating the effect of reduced dimensionality on magnetic properties of such structures.

Jacek Furdyna



Jacek Furdyna is a condensed matter experimentalist. He received his Ph.D. from Northwestern University in 1960 and has been at Notre Dame since 1987. He holds the Marquez Chair and is a Fellow of the Nanovic Institute for European Studies.



Professor Jacek Furdyna was elected a Fellow of the prestigious Institute of Physics (IOP), United Kingdom, in recognition of his status in the physics community. His research interests involve the preparation of new semiconducting compounds and the investigation of their physical properties. He is involved in an extensive program of collaborations with other institutions in the area of structural studies, magnetic measurements, and neutron scattering on the semiconductor systems described above.

Physics alumni are an interesting group. Upon graduation they head out into many diverse directions; from pure research to teaching to manufacturing to business school to medicine—physicists end up in fascinating places. Highly educated, intelligent and resourceful, physics alumni are an important part of what we do today.

The Department of Physics created its very first survey for physics alumni during 2004.

The main goal of the survey was to probe the perceptions of our alumni regarding Physics at Notre Dame today, as well as providing us with a glimpse of what our alumni are doing now! The majority of our respondents are still doing physics as shown in Figure 1. The survey was available on the physics web site and on paper by request during the late spring, summer, and early fall. Physics alumni responded enthusiastically. In total we received 160 responses to 39 questions. Not surprisingly, most alumni who responded lived in the United States.

We were particularly pleased with the responses to two very important questions:

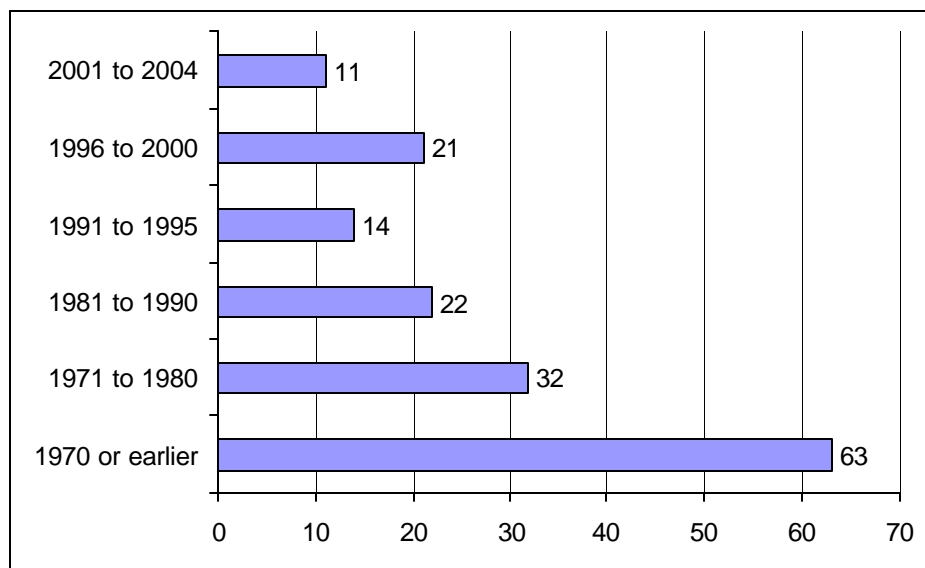
- 1) "What is your overall opinion of the Department of Physics at the University of Notre Dame?" and
- 2) "What is your response to the following statement? 'I am proud to have graduated with a degree in Physics from the University of Notre Dame.' "

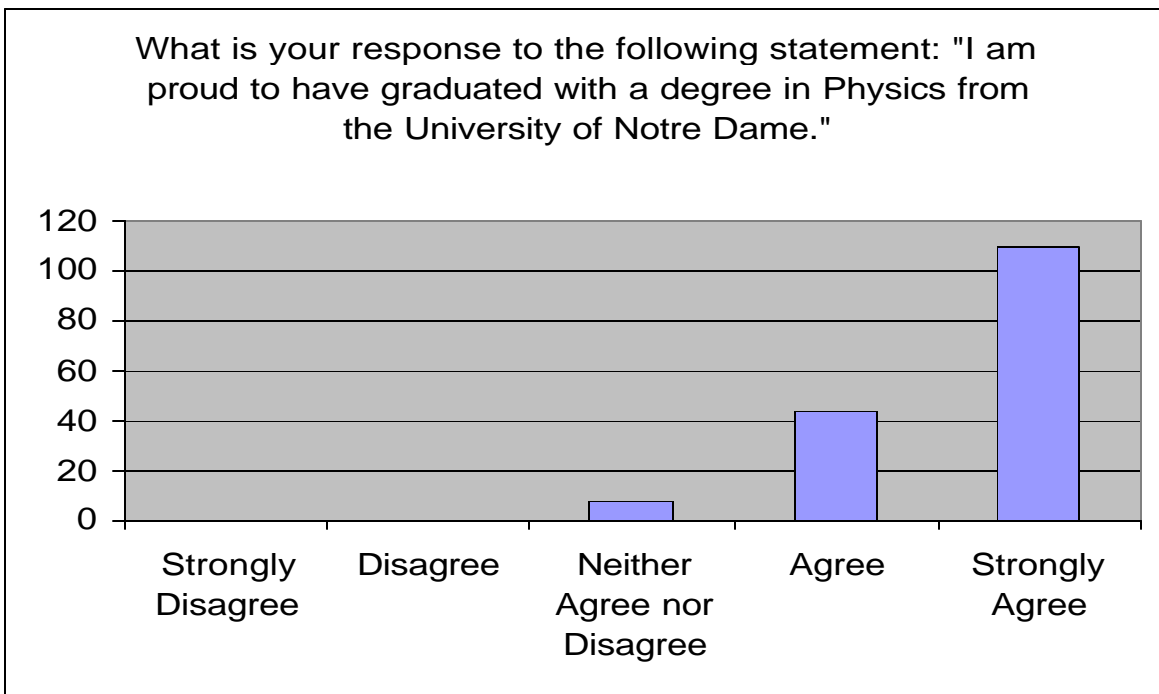
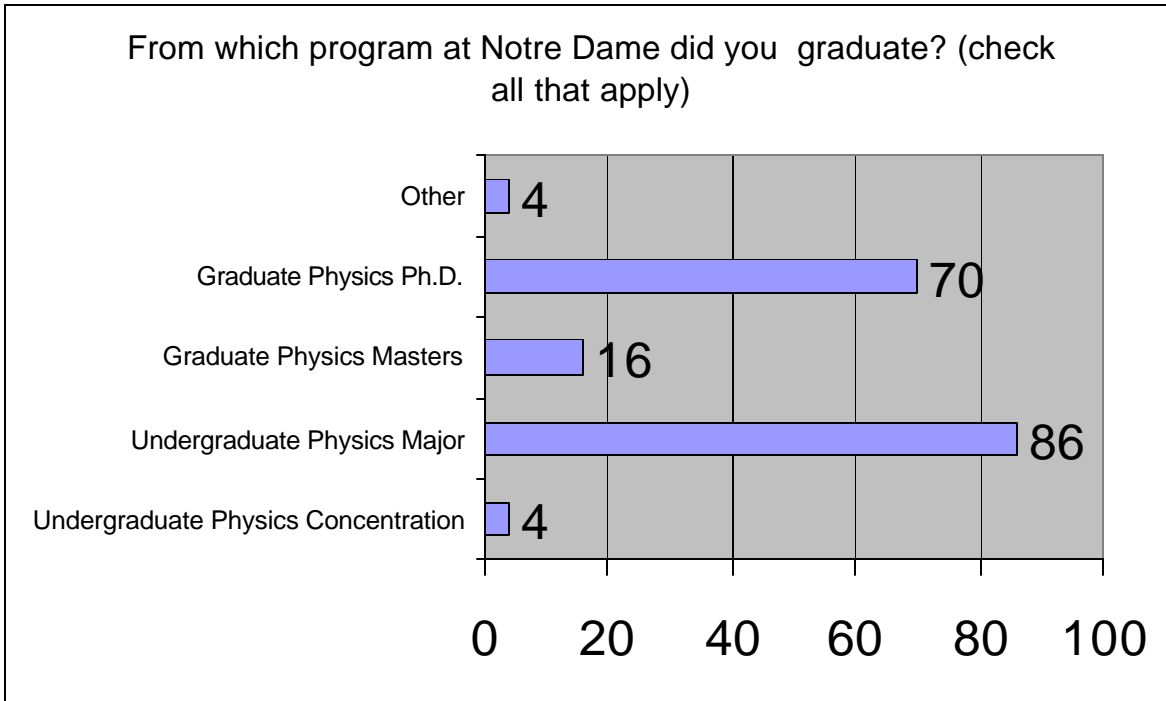
94% of alumni had a positive overall opinion of the department and 95% of alumni agreed they were proud to have graduated with a degree in Physics from the University of Notre Dame.

As a result of the survey and respondent's suggestions, the Department of Physics has introduced physics alumni activities including an open house on a Friday afternoon before a home football game and an annual reception during alumni weekend.

A complete copy of all survey responses are illustrated in the pages that follow. We thank all of our alumni who took the time to share their thoughts with us.

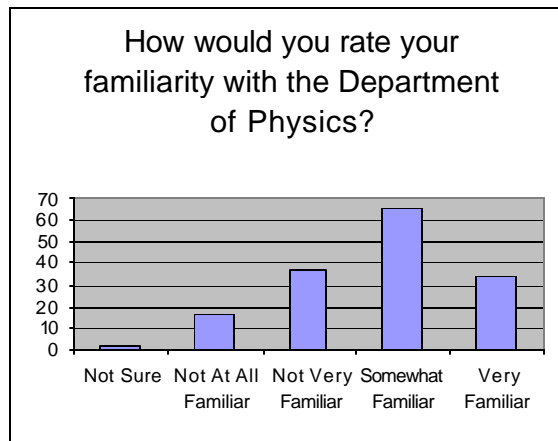
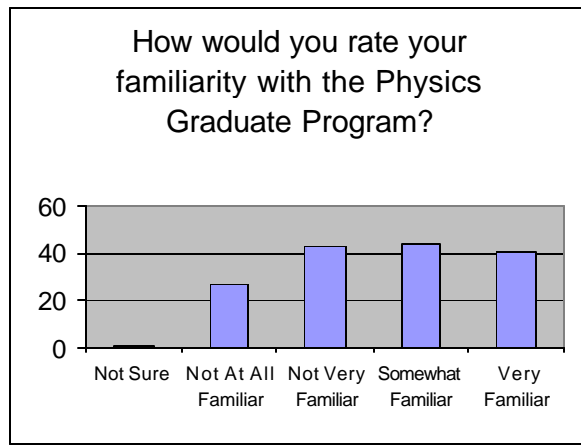
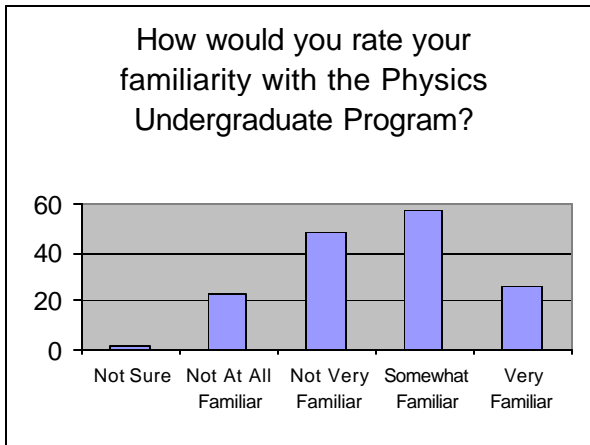
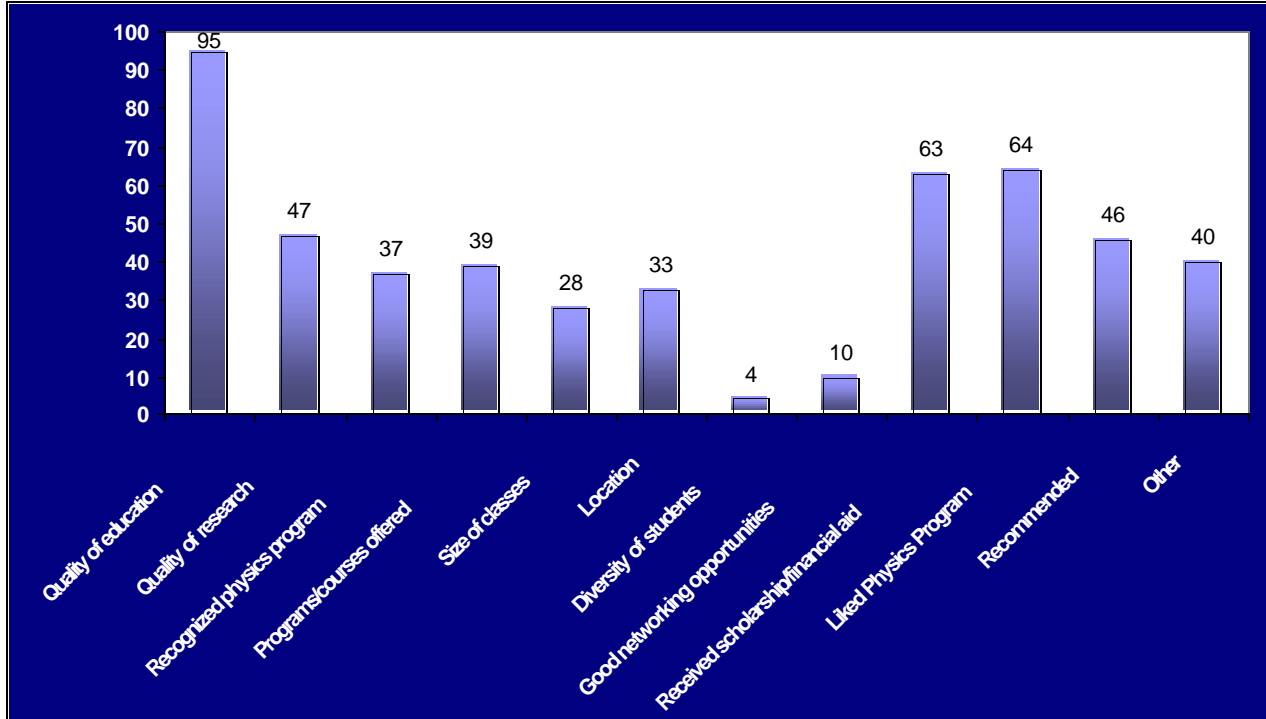
What year did you graduate? (Highest physics degree earned at Notre Dame)

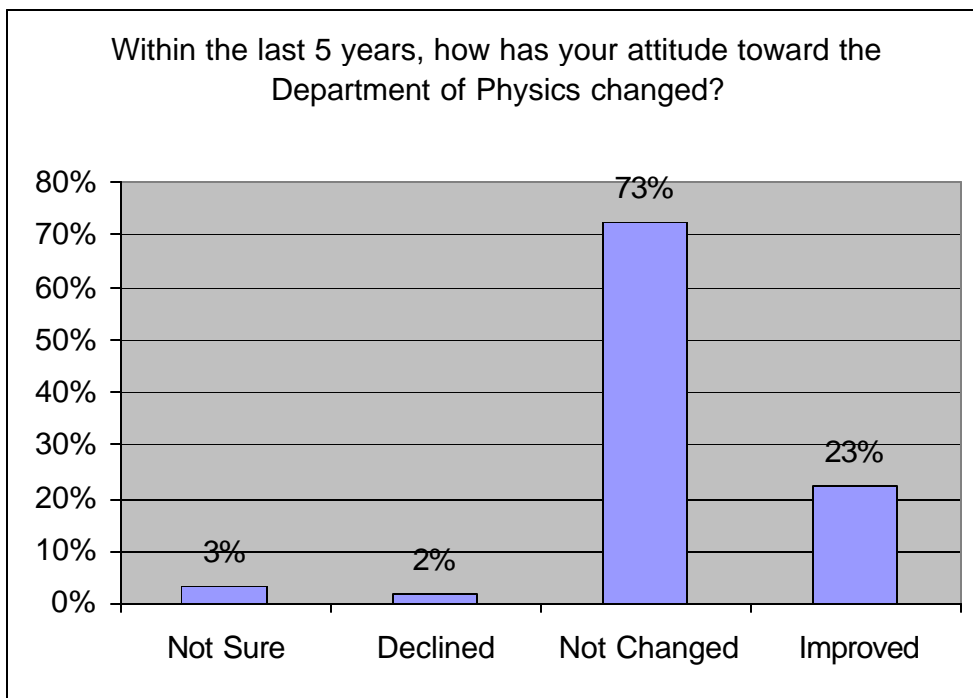
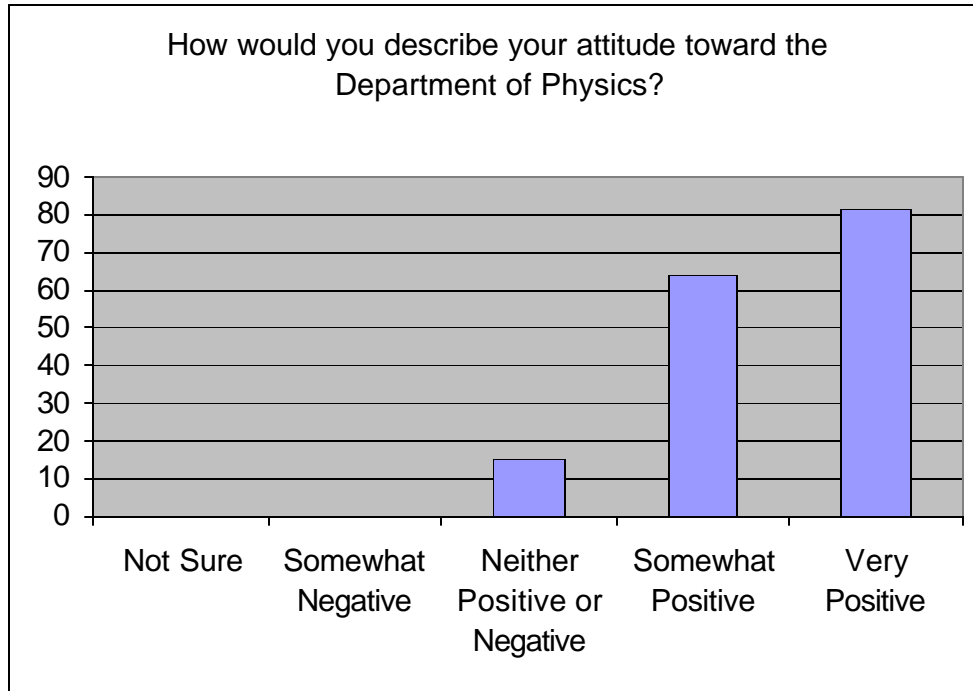


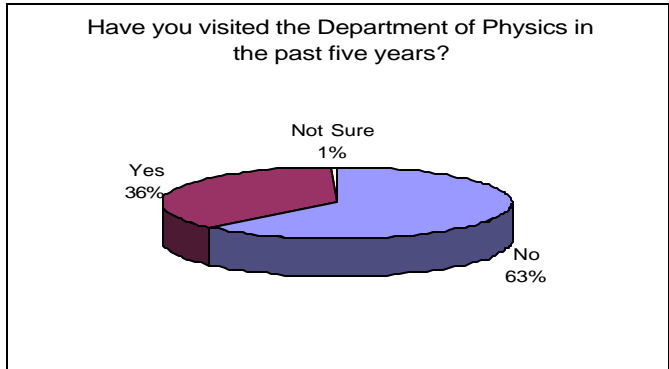
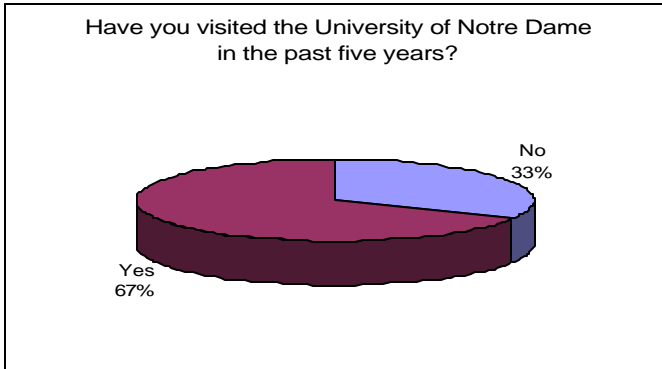
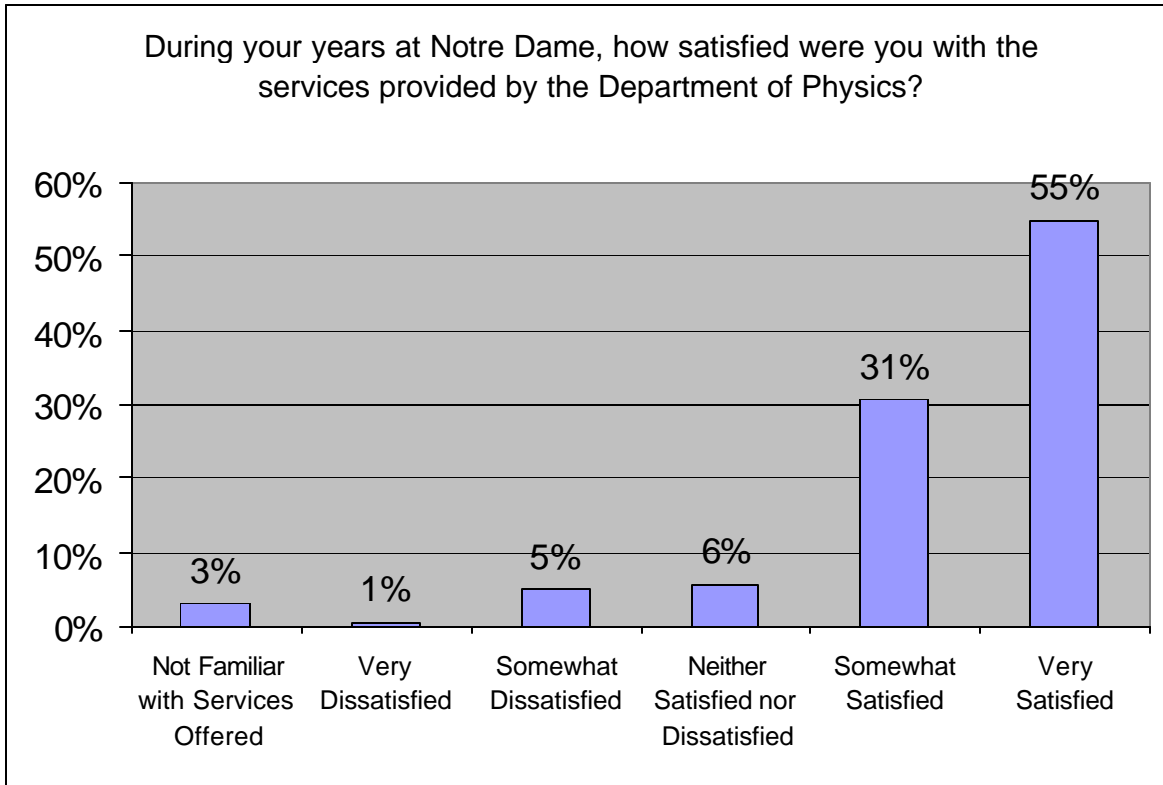


Alumni Survey

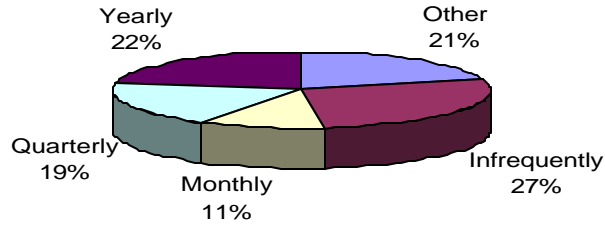
What were your main reasons for choosing to pursue physics at Notre Dame? (Choose all that apply)



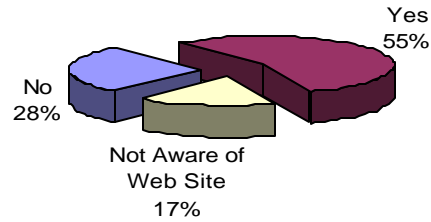




How often do you keep in touch with your advisor/professor?



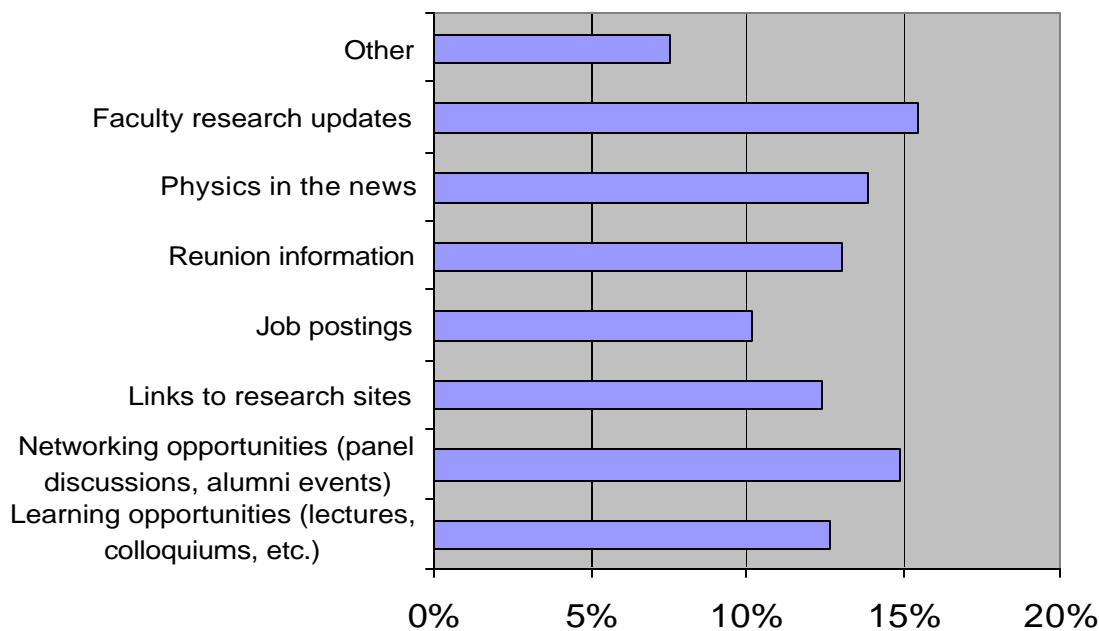
Have you visited the Department of Physics Web Site?



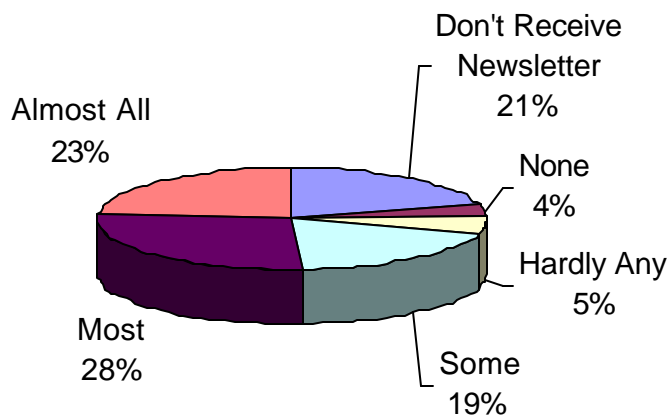
What were you looking for on the Physics Web Site?



What features and/or ideas would make the Department of Physics Web site a valuable tool for you?
 (Below is the ranking average of items respondents said they would like to see on the site.)

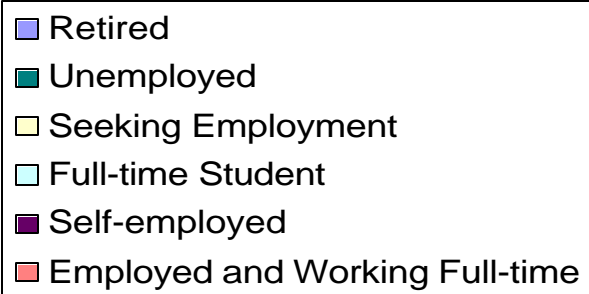
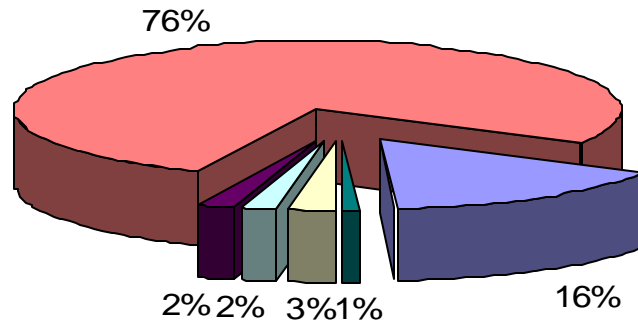


How much of the Department of Physics Newsletter "Physics Tracks" do you usually read?

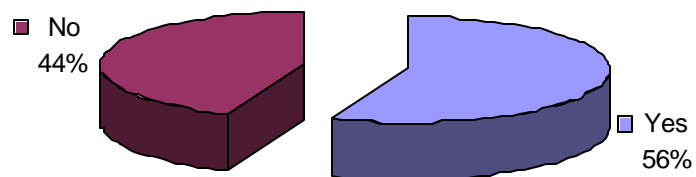


Alumni Survey

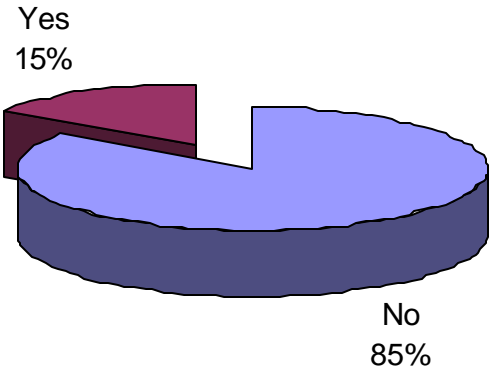
What is your employment status?



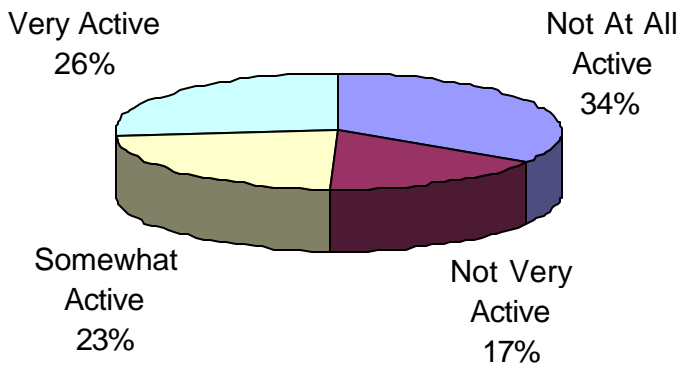
Are you still in physics?



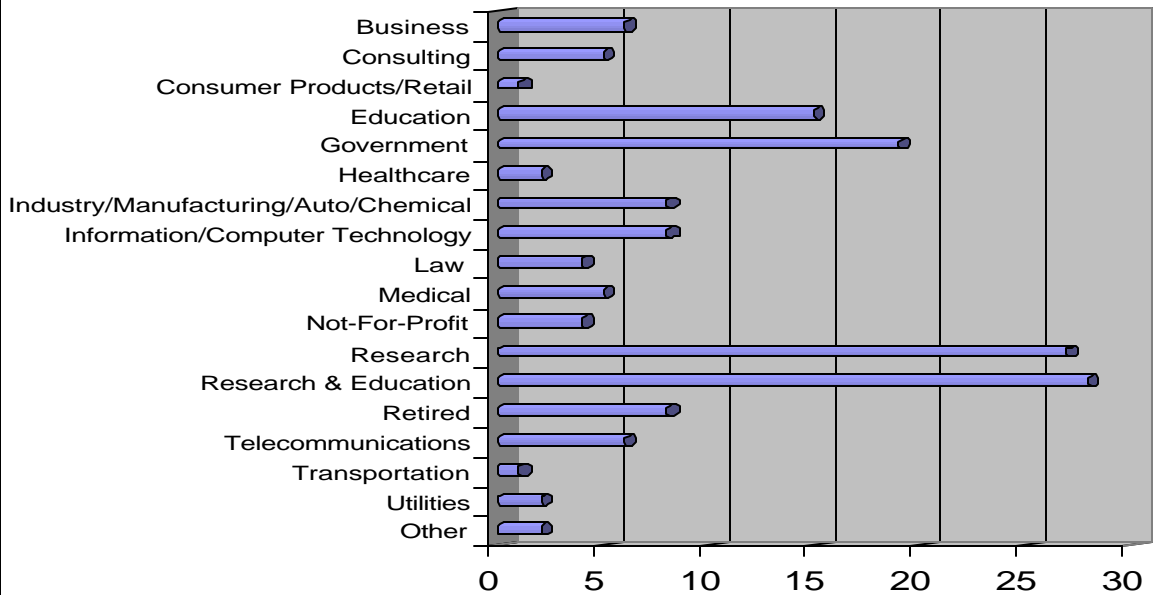
Do you currently collaborate with Department of Physics Professors?



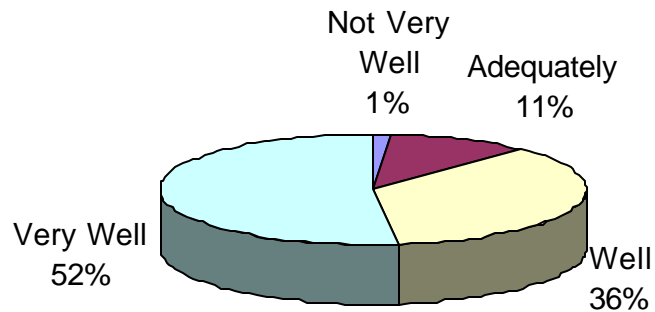
How active are you in your area of physics?



In what area/industry do you now work?

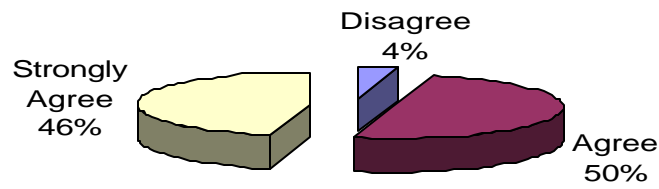


How well did your physics education at the University of Notre Dame prepare you for your career?

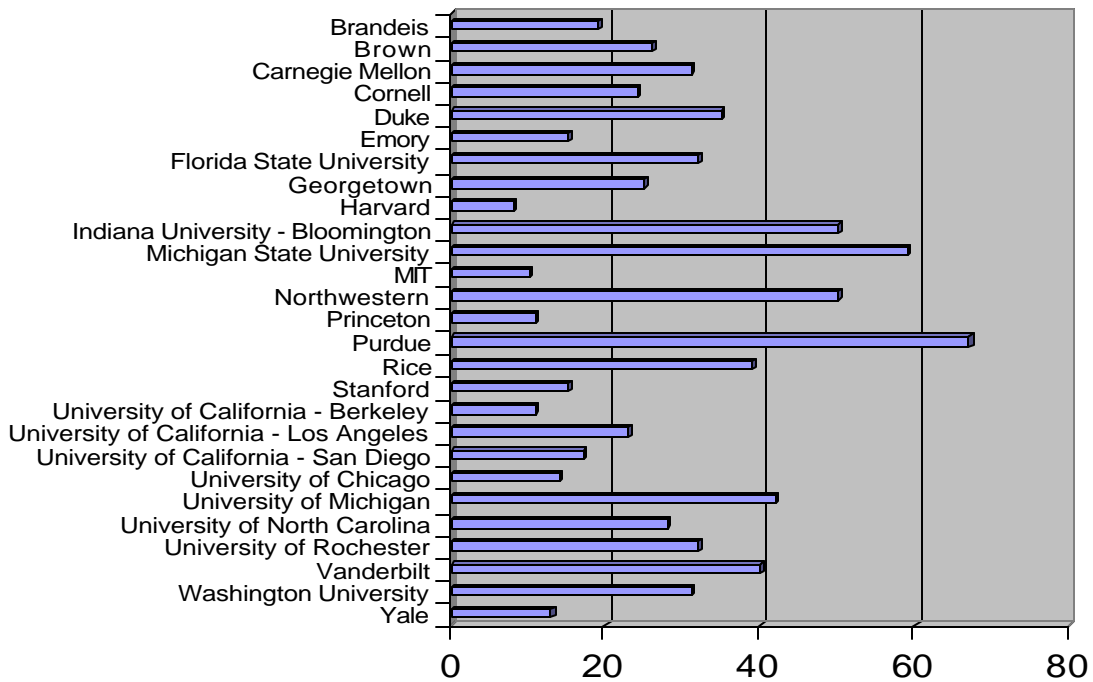


Alumni Survey

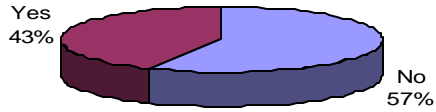
How would you respond to the following statement? "I would recommend the physics program at Notre Dame to prospective students."



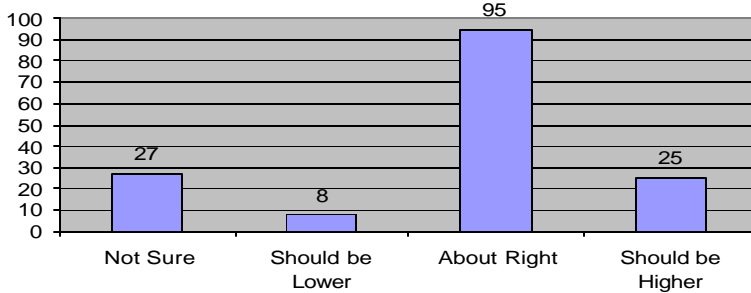
Which of the following do you consider as a peer institution to the physics program at Notre Dame? (choose all that apply)



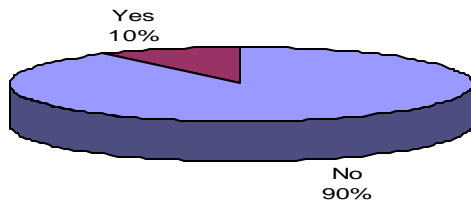
Rankings are the overall opinion of the quality of an educational institution/program. A ranking of 1 indicates the highest opinion. Did you know that Notre Dame is ranked 19th out of 228 in undergraduate education?



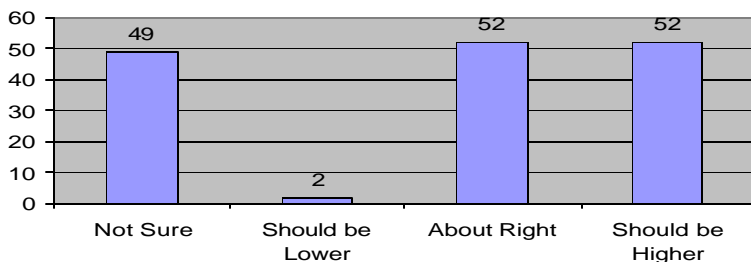
Do you think the undergraduate ranking should be lower, about right, should be higher, not sure?



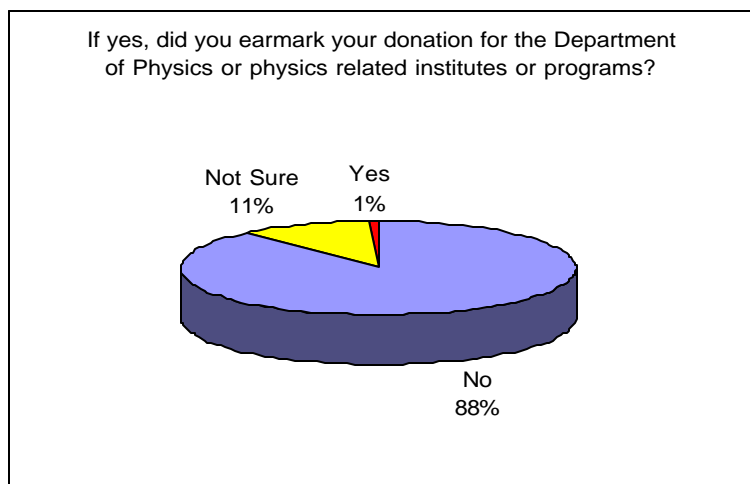
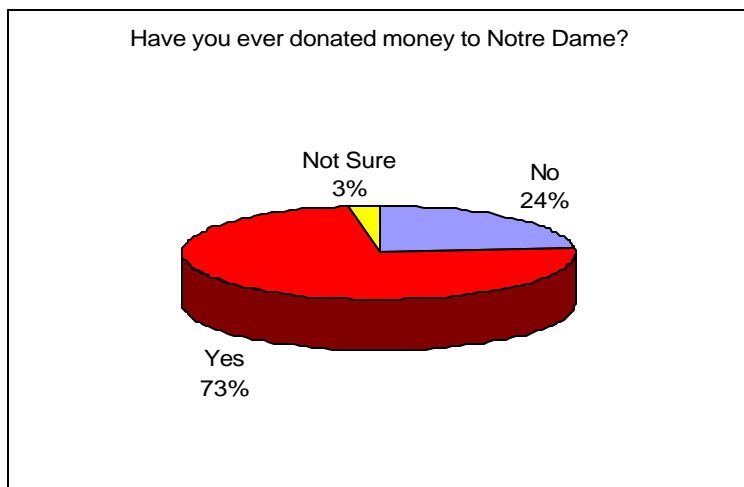
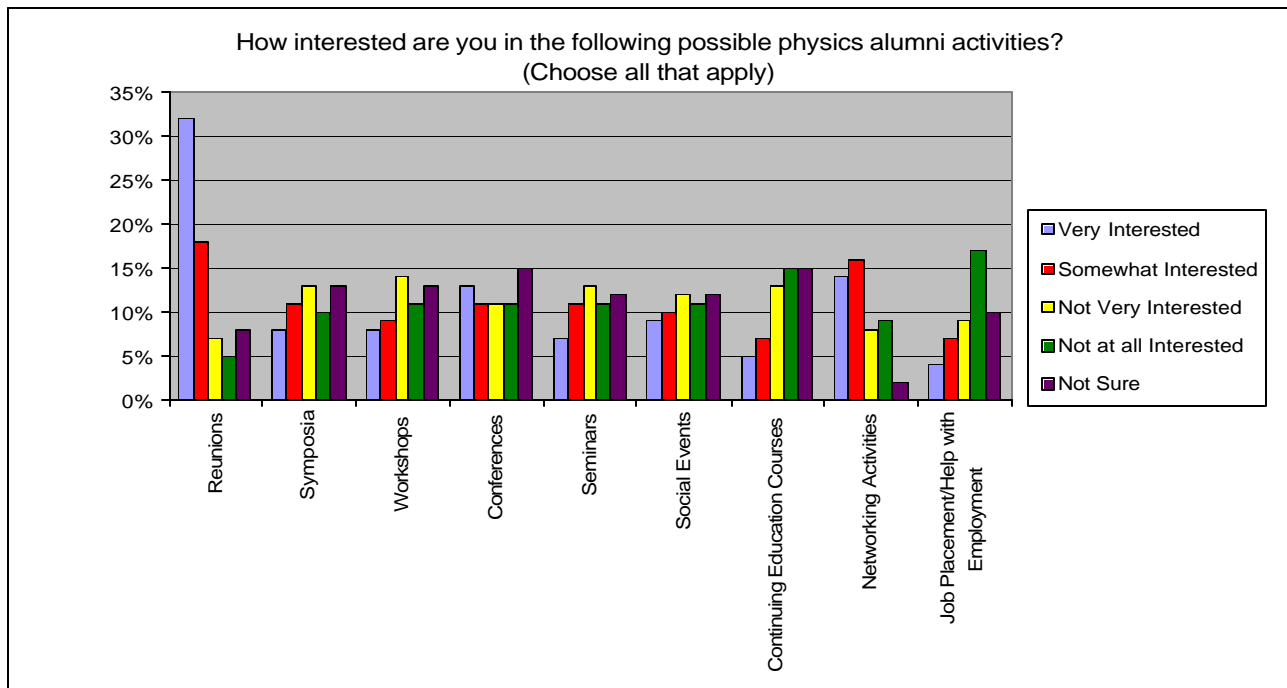
Rankings are the overall opinion of the quality of an educational institution/program. A ranking of 1 indicates the highest opinion. Did you know that Notre Dame is ranked 56th out of 147 in Physics Graduate Student Education?



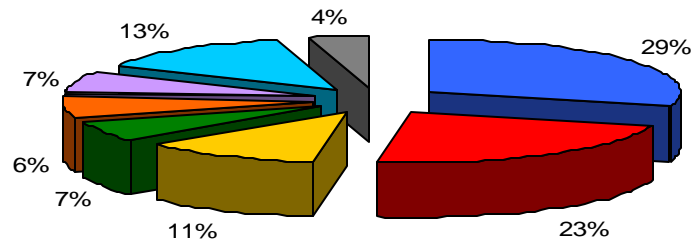
Do you think the graduate ranking should be lower, is about right, should be higher, not sure?



Alumni Survey

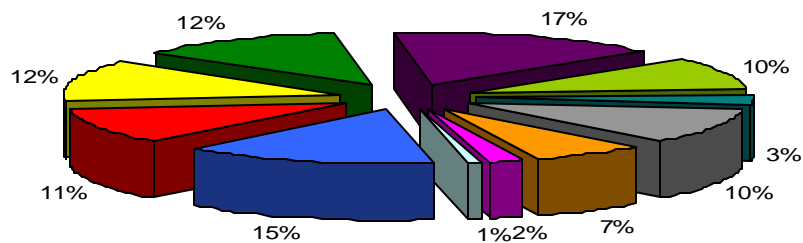


If you have not donated money, would you be more likely to give money to the Department of Physics if it was used for (choose all that apply):



- Scholarships for graduate or undergraduate students
- Fellowships for outstanding graduate or undergraduate students
- Lectures by faculty or special guest speakers
- Faculty research projects
- Specific Research Area
- Departmental Newsletter
- None of the Above
- Other

Which of the following would you like to have more information about? (choose all that apply)



- Alumni Activities
- New Faculty
- Current Faculty
- Retired Faculty
- New Emerging Research Areas
- Innovation in Curriculum
- Student Activities
- Special Awards and Prizes Won by Faculty and Students
- All of the above
- None of the above
- Other

If you were the Chair of the Physics Department, what one thing would you change?

Offer more courses on newest technology. Encourage the student to collaborate with groups from other departments within Notre Dame and also from groups from other schools and labs. Make the experimental solid state group as strong as the Notre Dame Nuclear Physics group.

Advisors could help students understand options they have available to them after graduation aside from graduate school. That was heavily emphasized, with almost no discussion of career opportunities without obtaining a Ph.D. first.

Assure that the faculty take their teaching responsibilities as seriously as their research.

Attention to engineering course requirements for broader career opportunities.

Attract top faculty.

Better counseling for undergraduates applying for graduate schools. In my class, my peers and I found it difficult to estimate which institutions we should be aiming for.

Better focus on the graduate program.

Bring in more astrophysics.

Cannot think of much. The current and last two chairs have done a good job. The most important need for the Physics Department is enhanced visibility both inside and outside the university, especially inside.

Devising a better way for Ph.D. students and advisors to team up. There was nothing in place that facilitated my finding an advisor that suited me in working style as well as topic. I was never aware of any departmental involvement in this process or any other with regards to my program. The mismatch ended up costing me many extra years of work unnecessarily. In the eleven years I spent there, I did not feel there was much support (other than financially) at the departmental level. I would want to put in place a support system to help graduate students in selecting an advisor. There should be some process by which the students become more aware of what their options are, what they should be looking for, and what the ramifications are. In my case, I spent eleven years instead of the normal 6 and a half years on my program because of an obvious mismatch in working style. This could have been avoided had there been at least a review process at the department level on an annual basis. I was never aware of any departmental involvement in my program, although I am sure there was. Communication to me from the department was extremely minimal and I felt quite isolated.

Do more applied physics.

Encourage greater access to research projects for undergraduate students.

Engage in more industrial research projects. I am the CTO for Eastman Imaging and have been in industry since graduation and I believe the most effective research is in context (sometimes stretched context) of real life problems - at least that should be the center of gravity. My experience with the University of Rochester are strong endorsements of this direction.

From my knowledge, things seem to be going well. Adding the newsletter "physics tracks" was a good move.

From what I have read and heard, it looks like the Dept. is doing a much better job on educating students than in my day in the early 70's. I say you are getting it right.

Graduate course curriculum. It should be more flexible to meet the needs of the student's research program. As the research programs in the department diversify, so should the course offerings.

Graduate students (in the first year) would take part in 3 different research groups.

Having more exposure for students to opportunities in applied physics areas in the business or government areas of employment.

I hope that you are not still teaching Classical Mechanics (Symon) to First Semester Sophomores

before they have completed Calculus III.

I look back fondly (in general) to my days in the Physics undergraduate program. My biggest regret is not taking additional senior research lab work. My one semester was easily the most rewarding part of my time there. I didn't take it in the Spring because my lab partner was uninterested and I too succumbed to senioritis -- especially since I knew I was not going on in physics. Much has changes in 33 years. About all I could suggest to the chairman is:

a. Keep your students aware of the type of career opportunities out there (even if they don't go on for advanced degrees in physics).

b. Help them to keep from getting discouraged by struggles in the early going. Sometimes these struggles are a message to think about a different major and career -- sometimes you've just got to push through it. I now realize that I was pretty much inept at the theory side of physics, but perhaps could have found physics happiness on the experimental side. Also, I had given up thoughts of an advanced degree long before I knew all of the possible options to consider. I would encourage you to help your students keep both an open mind and a realistic assessment of their capabilities and interests.

c. Engage your students (even the weaker ones) in research and lab work.

I really don't know because I'm not there now. I do feel that I got more attention as an undergraduate than did the undergraduates at my graduate institution. I feel that the value placed on undergraduate education was higher at ND and would hope that has continued. In retrospect, I think a seminar during junior year would have helped a lot. I do feel that I was ill prepared to get involved with something focused and worthwhile in the wide world of graduate work and even less able to find a role as a physicist in society. Interaction with practicing physicists, physicists-now-engineers, academics, educators and physicist-now-managers (etc.) would have been so helpful. I say Junior year because it is before the crunch of the senior job search and might make that search seem less desperate and "tracked" toward physics. In fact I left physics and went the engineering route because of insufficient contact with researchers with whom I could identify. I later found in graduate school that I identified more with the Physics grads than the engineers.

Undergraduate physics felt disconnected enough from the "real world," and I even don't believe one should so easily say that is something that ought to be changed completely -- that fact draws many idealists to the field. However, some real laboratory was offered only to seniors.

I understand your history in Nuclear Physics, that you have found a profitable niche (and that it is the research area of the current chair). But I am not convinced that it is a growth area or one for continued investment. So that management of this would be a concern if I were hypothetically the Chair.

I was quite pleased with the education I received nearly 40 years ago, but haven't kept up enough with the Department to be able to make a suggestion here.

I would allow graduate students to take candidacy examination even at 1st grade.

I would allow graduate students to have more opportunities to teach (not just lab classes, but lecture classes) undergraduate students.

I would increase graduate student stipends a bit and I would place more emphasis on teaching and on industrial applications of graduate physics education.

I would increase the diversity of the types of colloquium speakers that were invited to ND (i.e. Biologists, Geologists, Chemists, Botanists, etc.).

I would like to see the University have a higher profile in growing, high-impact areas of science.

I would make sure that Applied Physics was one career option for graduates of the B.S. program.

I would not give preference to, or give the perception of giving preference to, particular religious backgrounds or lifestyles in terms of hiring faculty or staff or accepting students. It is my impression that the University does this.

I would strengthen the job placement process for Ph.D. students. It is currently based almost entirely on the contacts of the thesis advisor.

Alumni survey

I'd set up alliances with industry partners to get students employment in their area of interest as summer students to improve employment opportunities after college. But you may already be doing that.

If the undergraduate modern physics lab still follows after the Modern Physics course, I would make them concurrent. The Modern Physics course lacked some relevance for me when I was a junior. (At that time, 1976, the laboratory was offered only to seniors.)

I'm the chair of an academic (engineering) department and I know changes only have real impact if the entire administration is on your side. I would work on making sure that the President, Provost, and Dean are all aligned for your next thrust.

For a small, mid-ranked department it makes sense to pick an area a little out of the mainstream and be the best in the world at it. I'm not sure if ND Physics has done this as much as it could.

Improve communication between the physics students and professors.

Increase awareness of the physics department within the general student population.

Increased emphasis (read: money) in condensed matter research.

Interactive student participation.

Invite guest lecturers, visiting scholars from other well-regarded institutions to collaborate in physics and get word out on breadth of work going on at ND.

It has been 26 years since I graduated. Although I do not know the current status, I suggest availability of survey courses (for undergraduates) and seminars (for graduate students) in biosciences and medical physics would be very useful to expose students to other applied areas of physics. There is a strong need for well-trained physicists to do research and development in many medically-related areas.

Make it easy for me and my classmates to get in touch through the Internet. I don't know where half of them are or what they are doing.

Make quantum mechanics mandatory for all undergraduate physics majors. The last time I checked, it was not. I know kids who got physics degrees from ND without taking quantum mechanics. Shocking!

Make sure education and research is done to its fullest capacity.

Move the solid state part of the department into research on materials for the hydrogen economy, such as a substitute for platinum catalysts for fuel cells. Eliminate the high energy physics activity and focus on the nuclear waste issue and new approaches to safer nuclear reactors that will be needed to make hydrogen from electrolysis of water. Bernie Waldman and Walter Miller worked on the A bomb in Los Alamos and were my thesis directors. I worked on the first hydrogen bomb and the first nuclear submarine at Westinghouse in the 50's and those were important programs that repelled the Soviet Union during the cold war. We need to eliminate our need for Mideast oil and we need to do it fast. My suggestions are for a Manhattan-type Project to make it happen. ND's Physics Department could be a leader in this critical endeavor to end our pouring money into the Mideast which funds Islamic terrorist enemies of the United States. I would be willing to send you a report I have written that details this strategy. Contact Frank Jamerson at elecbike@aol.com Naples, FL 239-566-1833. Thanks for listening.

My three major complaints about my ND experience are:

1) TA assignments for graduate students must be essentially equal in time demands; not just on paper, but in reality. This is an important issue, and inequitable assignments can be a serious disadvantage. When I started at ND I was spending over 20 hours per week on my TA duties, while I believe some of my classmates likely spent only 3 or 4 (or less?).

2) The structure of one of my core grad courses was, to be blunt, unconscionable. It made 'bending the rules' very easy, and some of us felt that some of our classmates did just that. I could go on, as there were many problems, but the point is that for a professor to imagine that he/she need not worry about the inherent fairness of a course's structure is an abdication of one's moral responsibility...and this at a school that touts moral behavior, etc. People's LIVES depend on successful completion of these courses, and I emphatically reject the notion that the department has no obligation to insist on fair and equitable treatment of its students because of

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tenure, or some other questionable rationale.

3) There needs to be a mechanism by which graduate students can truly air their sometimes very serious concerns about interactions with their advisor/committee, with an absolute guarantee that there will be no repercussions, either formally or 'under the table.'

Overall research emphasis in new and exciting directions e.g., biophysics.

Remove the qualifying exam from the graduate program.

Scheduling an annual reunion on a football weekend, so alumni can get football tickets and have extra incentive to attend and make a weekend out of it.

Seek more research funding to improve the graduate program.

Send personable professors, grad students, or upperclass students to high schools and recruit for physics students like football is recruited. Not many American students are interested in physics these days -- no money in it -- so ND needs to find a way to get the best and brightest available from the small pool available to come to ND -- scholarships (remember, just like football) would be good. From my answers you can see that I have very little knowledge of what's happening in the Physics Dept. I liked it when I was there, but I haven't heard much about it in many years.

Shift to condensed matter and solid state.

Since I graduated almost 40 years ago, I am not familiar enough with the program to comment knowledgeably. However, I would appreciate knowing about department research. I just received my first newsletter (and read about this survey in it) and this may be just the right amount of information. Also, I would appreciate being able to contact members of my graduating class in physics.

That is an interesting question but having spent a career in technical management I have learned that answering this question requires having walked in the Chair's shoes or at least being close enough to appreciate the "wear and tear" on them. From my observations thus far I would say that ND is blessed with an excellent chairperson.

The city in which the Department is located :-). More seriously, I would add more flexibility regarding course requirements for better prepared students. Probably 30-50% of the Graduate curriculum is redundant for international students.

Tough question. I know what's wrong with my department and university but I do not know about ND. One thing I do know is that people have a variety of talents and all faculty members should not be forced to fit into one mold. For example, research can be overemphasized for the worthy goal of a research university. I am in a land grant university (the first) and we have several missions, some of which are neglected.

When I attended Notre Dame in the 1980's experimental elementary particle physics was very emphasized. There was not much emphasis on theoretical elementary particle physics. I do not know if that is still the case, but if it is then I would like to see more theoretical elementary particle physics -- especially string theorist -- added to the staff/faculty.

When I was at ND, our class tried to find out about colloquia/seminars, etc. But no one seemed to have a master schedule of topic, date, time, room number, etc., so we gave up. I would change this. Actually, I would change this for the whole university, and have a weekly university-wide gazette that announced all upcoming lectures in all disciplines. This would greatly increase one's sense that the university is humming along with lots of scholarship.

When I was there not many of the faculty seemed to have any idea of the possibilities for Physics graduates in industry. When I was a Senior I was told that 'maybe' I could get a Master in Physics Education and teach in a Junior College. I went on to get a Ph.D. and have had a good career in applied physics in several companies involved in the aerospace industry. From the newsletter I get the impression that not much has changed, the emphasis is on academic careers in Physics, nothing about applied physics.

Wish I were more current to answer this well. I remember being about 13th in a group of 51 starting out as a freshman. By the middle of sophomore year, I was still about 13th - in a group of about 15. I remember it being VERY difficult anchoring the curve on which everyone was graded! I

probably belonged in Engineering; that is where I spent the next 30 years of my life (nuclear submarine officer).

Work to engage graduate students as part of the faculty family, where appropriate.

Work to improve relations with government and private industry to ensure adequate employment of graduates.

Wow, that is a hard one. There is so much good to say, yet...

1. My weaknesses were that although I am teaching undergrads now, I don't think I had adequate TA experience as a grad student. It would be neat to start a junior-teacher program with interested grad students. In other words, introduce the TA to the undergrads and have them more involved as a junior partner. I did have that opportunity to do something similar with Dr. Kolata and I am grateful for that. I wish I had more experience with Dr. Chagnon.

2. One thing I am very grateful to my dissertation advisor Dr. Bruce Bunker, was that he encouraged me to write grants and publications (especially the grants). This was also encouraged by the Bioengineering and Pollution Control Institute through which I had a fellowship. (Recently renamed the Center for Environmental Science and Technology) -- they gave us actual grants to review and evaluate. I realized that I did not have to be perfect!!!!

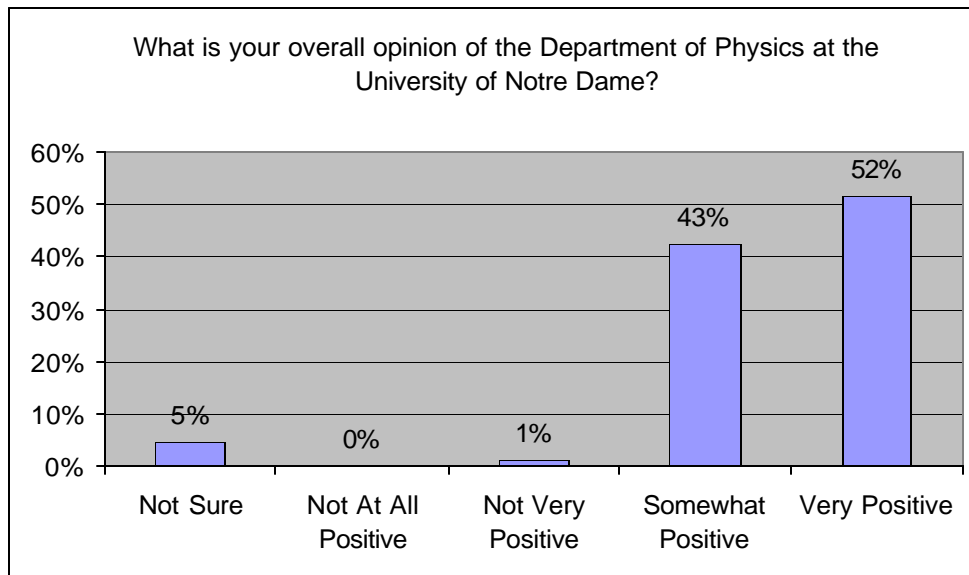
I encourage students to start writing grants. For example

- As undergrads-Couple of hundreds of \$ through SPS, for departmental equipment and SPS programs (and Sigma Pi Sigma)

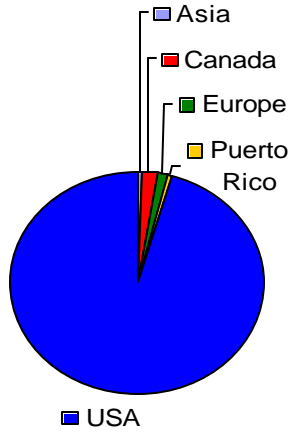
- As grad students for travel to conferences, etc. (Sigma Xi...)

The experience I had have made me a grant writer who has won over \$350,000 for my university. Students, regardless of their careers, will at one time or another have to justify their work in writing.

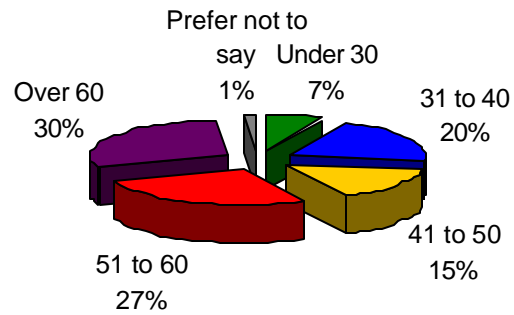
The Director of Institutional Research also gave a talk when I was there as a grad student. I attended it and it has helped me (initially for new faculty, they opened it to grad students. Thank you!!!) I cannot think of anything else right now.



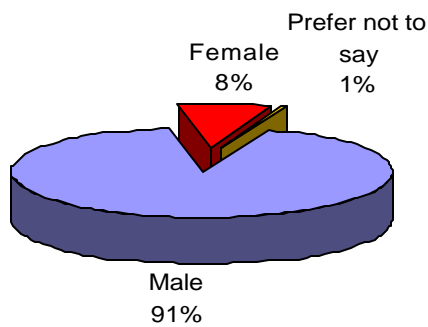
Where do you live?



What is your age?



Gender of Respondents



Alumni Survey

Please provide any additional comments or suggestions.

I am in a position to recommend ND to students shopping for a graduate program. Information about changes and innovations in the program would be of particular interest to me. Advances in the various research programs would also be of help in informing students.

Have a department open house or offer a tour on a Friday afternoon before a football game. I'd love to come and see what's changed -- likely everything.

I am Director of the Office of Nuclear Regulatory Research at the US Nuclear Regulatory Commission in Rockville, Maryland. I manage a staff of about 220 people with a budget of about 95 Million/yr. I would be interested in establishing a relationship with both the physics and engineering departments at ND in order to find if there are graduates interested in employment with the NRC. My Office is primarily interested in M.S. and Ph.D. graduates but other NRC Offices would be interested in all degree levels.

I am involved in managing government advanced research and development for space systems.

I am looking forward to my next visit to the department.

I am pleased to see the newsletter go out. For those of us who are no longer working in physics but still have an interest in what's going on in physics in general and in the ND Physics Department in particular, this and the website are very valuable sources of information.

I appreciate your efforts to make info about the department available. I enjoy being able to learn about current activities. I haven't looked yet to see if it is already available, but I would be interested to see today's course catalog.

I don't spend much time cruising the Web, so I appreciate the (paper, mailed) Newsletter.

I enjoyed the newsletter very much. For my sake, I'd like updates on retired faculty, because most of the faculty I had have retired or close to it. Thanks for putting out the newsletter. One hopes that the "Phyghtin' Photons" are still fielding competitive Bookstore Basketball teams.

I graduated so long ago (1962) that I am no longer familiar with the Physics Department as it currently exists, so many of my answers were not very definitive. However, my general impression is positive and I enjoy reading about the activities of the department even though many of them are not very relevant to my current situation, as I am nearing retirement.

I have primarily been working with at IUCF as an accelerator physicist building cyclotrons, synchrotrons and linacs, but am presently project manager for the conversion of our cyclotron facility into a Proton Therapy Facility for the treatment of cancerous tumors, The Midwest Proton Radiotherapy Institute. My work in graduate school at Notre Dame included the installation of the present FN Tandem, which started me in the direction of Accelerator Physics. Professor Walt Miller was my thesis director.

I like the new department Chair of Physics. Please keep up the good work.

I like the survey idea Ani :)

I look forward to seeing the results of the survey.

I met and married my wife at Notre Dame. Married by Fr. Bolger Sept. 1953. Father-in-law was Head of Education at ND, Prof. Bernard J. Kohlbrenner. Notre Dame Physics prepared me very well for Cornell Ph.D. in Physics, and Univ. of Maryland Hi Energy Physics -- before I became an administrator there. It also was very good background for being President of San Diego State University 1978-1996. And for being on the National Science Board 1984-1996, Vice Chair '88-'94.

I received my B.S. in Physics from Notre Dame in 1961. After graduation, I went to Case Western Reserve University and got a Masters degree in the emerging field of Control Engineering at their System Research Center. I then worked in the aerospace field for 7 years. After a lay-off, I entered Case Western Reserve Medical School and got my M.D. I then practiced Ophthalmology for 22 years, and have now been retired for 2 years. My B.S. in Physics from Notre Dame provided an outstanding foundation for this rather diverse career path. And it still provides a strong interest

Alumni survey

for me in retirement. I continue to read about Physics, and share ideas with several friends including my former classmates from Notre Dame, Bob Fraser (B.S. Physics 1961) and Bob Burckel (B.S. Math 1961). I look forward to getting my Notre Dame Physics Dept. T Shirt! Thank you!
Bill Parker, B.S. Physics, Notre Dame, 1961

I started college in pre-dentistry in East Tennessee. Transferred to ND at year 3 to work on my BS hopefully in Physics. I did not graduate with honors, just barely made it because of the shock of transfer from pre-dentistry at East Tennessee State College to ND. Selected for work on a BS in Ordnance Engineering at the USNGS and while there was one of 3 selected for the Advanced Science Program in Nuclear Physics. I applied for graduate school in Nuclear Physics, transferring from that Advanced Science Program at the US Naval Postgraduate School, sponsored by the Nuclear Physics Branch at the Office of Naval Research, and was rejected by ND. Was accepted at Duke and Univ. of Tennessee where I got a M.S. in Physics in 1963. Did several years funding R&D projects at the Naval Air Systems Command in a variety of physics related programs (i.e., High Power Electromagnetic Pulses, High Energy Lasers, Nuclear Weapons) and later various Ballistic Missile Defense related projects after leaving the Navy. My reluctance to visit the campus is related to being turned down years ago. I still feel that the studying habits I learned at ND helped me in all the following years.

I think this survey was a good idea. It's important to solidify your alumni base and keep people in touch with each other.

I very much enjoyed my years in the Dept. of Physics at ND! I have not switched fields to Computer Science due to not being able to solve the "Two Body Problem" with my wife an ND grad. in economics. Both of us teach here at Stetson University now. I would have preferred to remain in physics, and I do not care for computer science as much, but there was a position here in math and computer science and it satisfied my family needs. I cannot think of anything I would change in the department. It seems that you continue to hire outstanding faculty members doing very interesting work.

I went on to get a Ph.D. degree in Biophysics from The Ohio State University. I became a professor of Physiology and am currently a professor of Physiology and Biophysics at Case Western Reserve University. I have published a large number of papers in the field of excitable membrane physiology and muscle physiology.

If you do send a t-shirt, please make it size medium! Thanks. (P.S. I often wear a t-shirt I made myself with Maxwell's equations on the front.)

In studying physics/math the libraries at ND are the most complete/useful I have ever seen. This resource and its relation to graduate study could use more publicity.

It would be nice if the Physics department would sponsor a reception for alumni in conjunction with the reunion weekend in June each year.

It's great to see the Physics Dept. reaching out to alumni to keep us involved in what's going on. "Physics Tracks" is a great idea, too.

Just wanted to say that the staff was the best while I was a grad student there!

More incentive for better Graduate teaching should be given to tenure-track professors. They tend to be preoccupied with research. While this is understandable, I've had lectures based entirely on transparencies copied from the textbook.

My Master's in physics was the "ticket" I needed to get into college teaching. THANK YOU, NOTRE DAME, FOR THAT! I am a bit of a "quiet maverick." Among the things I have done since getting that degree:

- 1) Worked in Ft. Wayne as a vacuum tube engineer (2 years)
- 2) Designed and constructed Geiger counter tubes for the military (3 years)
- 3) Worked as an oil well logging engineer (3 years) for Schlumberger near the mouth of the Mississippi river
- 4) Produced and hosted 160 half-hour ETV science shows
- 5) At Loyola University in New Orleans I taught over 9,000 students (39 years) before retiring in 1998

Alumni Survey

- 6) Was recipient of Loyola's highest faculty award (their "Dux Academicus"), the only one to date to receive it without having a Ph.D.
- 7) Was ordained a catholic permanent deacon in 1980 and have worked with street people (part-time) since then.
- 8) Wrote the history of Loyola's physics department (someone ought to write the illustrated history of Notre Dame's Physics Department!).
- 9) I recently completed a manuscript entitled "The Cosmic Mystique."

My physics background has served me well - I hope ND physics can be more of an international player. Good luck - Matt O'D.

My Physics education is a conundrum. Even a cursory check of my transcript would show I had plenty of difficulty. Yet, in the manufacturing environment I've been in for the last 36 years, I find myself in the middle of the pack when I work with the most talented people and impatient with most due to my abilities. I would say I was unprepared for this experience with the education I got. I hope that enough of the Physics department has come to realize that many (probably more than half) of the graduates go into my kind of life -- not research and academia. Hopefully there's someone at the helm who can prepare us poor shmucks for the "other" real world.

Not being familiar with the current department any comments evaluating the department can not be of much value. I do know that when I arrived at MIT (where I got my doctorate), the MIT graduates knew a lot more physics than I did! Notre Dame did not prepare me for MIT.

I have TRIED to change my information in the Alumni Locator for years now, with zero success. My address and phone number above are current, and I am no longer "CDR David Zusi." I was promoted to Captain in 1995 (another change long attempted but meeting with no success), but my Navy rank is now a moot point, having retired from active duty as a Captain in October of 2003. I am now just "Mr." or "Hey, you" as the occasion requires.

On question 22, I chose the "adequate" response for my training. I should add that the Physics Dept. was not responsible for the shortcomings in the training. I was in the Concentration program and I chose to take as many non-physics courses at ND as possible (and I enjoyed them). I was presumably not supposed to go to physics grad school, but did anyway. My choice to not take many of the physics courses left me with holes in my training once I got to grad school. But it worked out.

Over the years I have heard nothing but positive comments about the quality of the Notre Dame physics program. In particular, the High Energy and Nuclear Physics groups have always had high acclaim amongst colleagues of mine at different universities and laboratories. I am proud to have had the opportunity to work with Bill Shephard, Nripendra Biswas and Neal Cason and have received my postgraduate education at Notre Dame.

Please check out my website www.ebwr.com EBWR stands for Electric Bikes Worldwide Reports.

Questions were aimed at recent grads. Some not applicable to those of us that graduated all too long ago and do not live in the vicinity of ND. What I would like are references to particular topics in physics publications. e.g. a current clear interpretation of Schrodinger's equation.

Say Hi to Tristan

Size small if you have them. I have an old ND Physics t-shirt that is fairly worn. Hope the survey is going well. As you can tell, I had a very positive experience and I truly think it helped me get to where I am today. I am currently working on a combined M.D./Ph.D. program. My Ph.D. will be in Biomedical Engineering and my research is in MRI. My physics background played a large role in choosing a lab.

Surveys such as this are good to help us think more seriously about our alma mater, and to reflect on the education we received. Of several schools I am familiar with, the department of physics faculty at Notre Dame combine best the ideals of big time research with a continued focus on the overall education of its students. I look forward to the department becoming even stronger in the future

Thanks for asking our opinion. Go Irish!

Alumni Survey

Thanks for the opportunity of this survey. I think it has been needed for a long time.

Thanks very much. I am very happy to have a connection to my physics program.

The idea of this survey is a good one, but I have probably skewed the results. When I was VP I got t-shirts from many of the departments (including physics) without having to fill out a 19-page questionnaire! Oh well, so much for former rank!

The newsletter is a very worthwhile innovation. Previously I got information only through my former advisors, Profs. Mihelich and Funk.

There is no question that the quality of physics done at ND has improved markedly since my time there. It is almost impossible to judge the undergraduate teaching quality at this distance. If it, too, has improved, it would be fantastic!

This is a good idea, long overdue. I'm interested in the web site and will visit it.

This survey was a good tool to obtain alumni feedback. It might be helpful to have a directory of physics alumni along with the city and state they reside in and their current employer or employment status.

Thanks for providing us the opportunity of participating in this survey. Had I remained in research and/or lived closer to ND, I expect that I would have been able to have better insight in some of the questions, to which I only partially responded. Perhaps I will save that participation for the second half of my life.

Wasn't clear from the survey, but I assumed you wanted to know how I feel now about the department, not back when I was there. Not having visited very often, and only talking with professors who are in their offices during reunion week (generally very few), it has been difficult to keep up with anyone. The department seems far better now about working with the undergrads than when I was there. They mostly didn't give a BLEEP back then, although some were very good. But ND as a whole has changed a lot since then in a more positive, helpful attitude towards undergrads, instead of viewing them only as tuition sources and potential contributing alumni.

Would be interested to know where my class of 1972 (B.S. - physics) ended up career and location wise. I lost touch with all classmates but might rekindle contacts if I knew where they were. Ideally, I would receive a list of names, occupations, addresses, e-mails and photos from yearbook.

Letter from the Chair cont'd from page 2

studies including one on Graduate Education published late in 2004 by the Nuclear Science Advisory Council.

We have dedicated this issue of the newsletter to reporting the results of our alumni survey. I would like to thank all of you who participated in the survey. We have included the comments made to the chair and suggestions to the Department. We wanted to know how you perceive us as we make progress towards our mission. Our mission is two-fold: to provide an **outstanding and distinctive education** to our undergraduate and graduate students and to expand our research enterprise via centers and institutes to achieve **national and international prominence in strategic research areas**.

Finally, please let us know when you will be visiting campus. I would be delighted to show you around!

Ani Aprahamian

Physics Department Chair

The World Year of Physics (WYP 2005) is a worldwide celebration of physics and its importance in our everyday lives. Physics not only plays an important role in the development of science and technology but also has a tremendous impact on our society. The Physics Department at Notre Dame aims to raise the awareness of physics within the Notre Dame community.



The year 2005 marks the 100th anniversary of Albert Einstein's 'miraculous year' in which he published three fundamental papers, all in a few months. The first paper claimed that light must sometimes behave like a stream of particles with discrete energies, 'quanta.' The second paper offered an experimental test for the theory of heat. The third paper addressed a central puzzle for physicists of the day - the connection between electromagnetic theory and ordinary motion - and solved it using the 'principle of relativity.'

At Notre Dame, the Physics Department is celebrating WYP 2005 with a whole series of programs that will open doors to the Physics Laboratories for the community of students/faculty/alumni as well as the Michiana public. There will be a series of distinguished lecturers, a movie series at Cinema@ND, collaborative projects with the Department of Music, the Nanovic Institute for European Studies, and the new DeBartolo Performing Arts Center.

Below is a complete list of scheduled of events.

WYP 2005 Lectures, Colloquia and Other Special Events

January 12

Opening Colloquium for 2005
Professor Don Howard on the History & Philosophy of Science at Notre Dame
4:00 p.m. in 118 Nieuwland Science Hall

February 4

Edison Lecture for the College of Science
Professor John Stachel, Professor Emeritus of Physics and Director of the Center for Einstein Studies at Boston University
8:00 p.m. in McKenna Hall Auditorium (CCE)

February 4-6

The History and Philosophy of Science Graduate Program at the University of Notre Dame is pleased to host the 2004-2005 meeting of JASHOPS - The Joint Atlantic Seminar for the History of the Physical Sciences.

In keeping with the spirit of WYP, the 2004-2005 JASHOPS meeting will take as its main theme "Images of Scientific Genius" and will feature as its keynote speaker on Friday, February 4, John Stachel, Emeritus Professor of Physics at Boston University and the first editor of The Collected Papers of Albert Einstein, speaking on the topic, "Einstein's Miraculous Year." The conference will be held in McKenna Hall (Center for Continuing Education) on the campus of the University of Notre Dame. All sessions will be free and open to the public.

World Year of Physics

March 30

Public Lecture
Dr. Philip Sakimoto of the University of Notre Dame
"The Universe - and Everything In It"
8:00 p.m. - 102 DeBartolo Hall



April 20

"Cosmology: Physics & Philosophical Perspectives," a workshop to be hosted by the Joint Institute for Nuclear Physics and the University of Notre Dame Physics Department. Philosophers and physicists will speak.

April 20

Miller Lecture
"Einstein's Biggest Blunder?: A Cosmic Mystery Story"
Dr. Lawrence Krauss of Case Western Reserve University
7:00 p.m. - 131 DeBartolo Hall

April 22-23

Arcadia Conference sponsored by the Kaneb Center

Summer

The Joint Institute for Nuclear Astrophysics (JINA) and the Department of Physics will sponsor a physics & film series at the Browning Cinema in the DeBartolo Performing Arts Center, June - November.
Look for more details at www.JINAweb.org and/or www.physics.nd.edu

June 2-5

Alumni Weekend
Physics Talks/Tours/Colloquium all day on Friday, June 3 and Saturday morning, June 4
Friday evening, June 3, Dinner for Physics Ph.D. and Master's Alumni
Peter Lombardo, Director of Graduate Programs

September 4-9

International Conference at Notre Dame
"Capture Gamma-ray Spectroscopy 12 and Related Topics"
Professor Ani Aprahamian (Chair)

September 9

Music and Poetry to Hubble Pictures
Ensemble Galilei performs Irish, Scottish, Early and Original music. For the 2005-2006 season, these Telarc recording artists are offering a series of innovative programs, including two with guest artists - the group will be joined by renowned Scottish folk singer Jean Redpath for selected concert appearances and will be joined by NPR journalist Neal Conan (host of NPR's Talk of the Nation) for programs of music, spoken word and projections of new images from the Hubble Space Telescope
DeBartolo Center for the Performing Arts

Fall

Football home game weekends - Talks and Labs open to the public

Physics Alumni Reunion

The Department of Physics invites all alumni to help celebrate the **World Year of Physics** at Alumni Reunion Weekend, June 3-5, 2005. In addition to Notre Dame graduates from years ending in '00 and '05, the Alumni Association has also invited all physics graduates (bachelor, master and doctorate degrees) to attend Reunion this year. If you have not received registration information in the mail by now, please contact Mr. Peter Lombardo (79 Ph.D.), Director, Program Development/ Graduate Alumni for the Alumni Association.

You may reach him by *email at Peter.J.Lombardo.1@nd.edu* or by *phone at (574) 631-7005*. Included in this edition of the newsletter is a preliminary listing of special physics activities that will take place during Reunion Weekend. We hope you can join us.

Alumni Reunion Weekend

Department of Physics Agenda (Tentative)

Friday, June 3, 2005

9:00 - 9:45 a.m.

Lecture

"The Universe and Everything In It"

Dr. Philip Sakimoto

Department of Physics

184 NSH

10:00 a.m. - 12:00 Noon

Department of Physics

Faculty Presentations

30-minute talks on topics ranging from relativity to the origin of life in the universe

184 NSH

1:30 - 3:30 p.m.

Department of Physics Laboratory Tours

Nuclear Physics, Condensed Matter,

Atomic, QuarkNet, BioComplexity

Center, Jordan Hall of Science,

Classrooms, and Administrative Space

3:30 - 4:00 p.m.

Pre-Colloquium Refreshments

124 NSH

4:00 - 5:00 p.m.

Colloquium/Keynote Address

Prof. Laszlo Barabasi

Emil T. Hofman Professor of Physics

Author of "Linked"

118 NSH

5:00 - 6:00 p.m.

Reception to celebrate World Year of Physics

Hosted by the Department of Physics

Hallway and Stairwell outside of 118

NSH

Saturday, June 4, 2005

9:00 - 9:45 a.m.

Miller Lecture

"Relativity & Einstein"

Professor Chris Kolda

Department of Physics

184 NSH

10:00 - 11:00 a.m.

Alumni and Graduate Student

Networking Reception

Hallway outside 184 NSH



This year we had three faculty winning special honors. **Prof. Ikaros Bigi** was the co-winner of the APS Sakurai prize in High Energy Physics. **Prof. Bigi** and **Malgorzata Dobrowolska-Furdyna** were elected to fellowship in the APS. **Prof. Jacek Furdyna** was elected to fellowship of IOP. This brings the percentage of Physics Department faculty who are fellows of the APS to 46%.

Prizes later in their careers, and hundreds have received other honors.

Professor Eskildsen is interested in studies of superconductivity, especially in the vortices induced in type-II superconductors by an applied magnetic field.

Professor Eskildsen took up a position as Assistant Professor in the Department of Physics in August 2003.

Special thanks to Jennifer Maddox, Departmental Administrator, for the countless hours she devoted to the development of the alumni survey and the compilation of all the data received.

Thanks also to all the alumni who took the time to complete the survey. Be assured that all your comments will be taken into account as we continue to develop our website and this newsletter.

Sloan Fellowship



Please join us in congratulating Professor Morten Eskildsen, recipient of a Sloan Research Fellowship for studying vortices in superconductors.

The Alfred P. Sloan Foundation, a philanthropic nonprofit institution, was established in 1934 by Alfred Pritchard Sloan, Jr., then President and Chief Executive Officer of the General Motors Corporation.

The Sloan Research Fellowships were established in 1955 to provide support and recognition to early-career scientists and scholars, often in their first appointments to university faculties, who were endeavoring to set up laboratories and establish their independent research projects with little or not outside support. Financial assistance at this crucial point, even in modest amounts, often pays handsome dividends later to society.

Selection procedures for the Sloan Research Fellowships are designed to identify those who show the most outstanding promise of making fundamental contributions to new knowledge. Sloan Research Fellows, once chosen, are free to pursue whatever lines of inquiry are of the most compelling interest to them. Their Sloan funds can be applied to a wide variety of uses for which other, more restricted funds such as research project grants cannot usually be employed. Former Fellows report that this flexibility often gives the fellowships a value well beyond their dollar amounts.

Aside from the monetary aspect of the fellowships, less tangible benefits have been cited by former Fellows. The early recognition of distinguished performance which the fellowships confer, after years of arduous preparation, was said to be immensely encouraging and a stimulus to personal and career development. Twenty-six Sloan Fellows have won Nobel

2005 Shilts/Leonard Teaching Award



Professor Randal C. Ruchti, of the Department of Physics, is the recipient of the prestigious 2005 Rev. James L. Shilts, C.S.C./Doris and Gene Leonard Teaching Award in the College of Science.

This award is named in honor of Father James Shilts, who taught in the Department of Physics from 1961 until his death in 1982, and is presented annually for excellence in teaching at the undergraduate and/or graduate level. All faculty in the College of Science are eligible for the award, which was inaugurated in 1983. This award, which recognizes only one College of Science faculty member each year, was endowed in 1984 by Doris and Eugene (Gene) Leonard. Gene Leonard was a member of the Science Advisory Council from 1976 until 1991.

Professor Ruchti received his Ph.D. from Michigan State University. He joined the University of Notre Dame in 1977. In addition to the Shilts/Leonard Award, he received a Madden Teaching Award in 1990, the Presidential Award in 2000, was elected a Fellow of the American Physical Society in 2001, and was a Faculty Fellow in the John A. Kaneb Center for Teaching and Learning in 2003-2004. One of Ruchti's favorite projects is the QuarkNet program which he helped establish in 1999. QuarkNet engages teachers, and subsequently their students, with scientific investigations, engages particle physicists with current issues in science education and provides science experiences to those in the local community. The Notre Dame QuarkNet program continues to grow, bringing physics challenges to teachers and high school students in and around the Notre Dame area. 53 centers have been established nationwide with Notre Dame's center being the most active.

The newsletter of the Department of Physics at the University of Notre Dame is published semi-annually.

Please send all inquiries and comments to

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Lesley Krueger, Editor

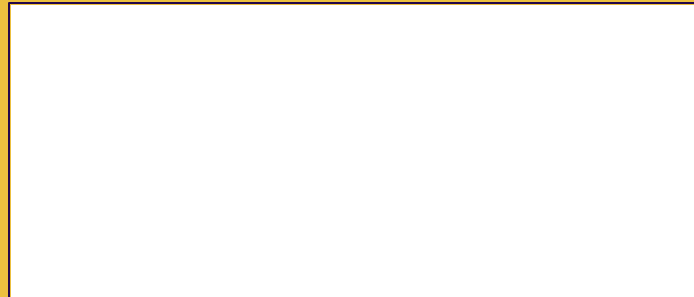
Our Cover: *The World Year of Physics 2005* is a United Nations endorsed, international celebration of physics.

Events throughout the year will highlight the vitality of physics and its importance in the coming millennium, and will commemorate the pioneering contributions of Albert Einstein in 1905. Through the efforts of a worldwide collaboration of scientific societies, the World Year of Physics brings the excitement of physics to the public and will inspire a new generation of scientists.

To read more about WYOP 2005, go to the website
<http://www.physics2005.org/>

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Physics Tracks

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University of Notre Dame
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