



NORTH DAKOTA STATE UNIVERSITY

Summer 2013

<http://www.ndsu.edu/physics>

Another Year, Another Transition

It seems to have become a tradition to tell you about changes in NDSU's administration in our annual newsletter. In 2010 there was President Chapman's resignation and the naming of Dean Bresciani as NDSU's new president. In 2011 it was the appointment of Bruce Rafert – a physicist – as Provost, and last year it was the recruitment and hiring of Scott Wood as the new Dean of the College of Science and Mathematics. This year, in keeping with tradition, there has been another change. Dr. Philip Boudjouk resigned from his position as Vice President for Research, Creative Activities and Technology Transfer during the last academic year. After a national search, Dr. Kelly A. Rusch, professor and former administrator at Louisiana State University, Baton Rouge, has been hired as Vice President for Research and Creative Activities at NDSU. In her role, she will facilitate, coordinate and advance research at NDSU and foster economic development. Dr. Rusch will begin work at NDSU in late September.

Philip Boudjouk was named the University's first Vice President for Research, Creative Activities and Technology Transfer in March 2000. He has been active as a teacher, researcher, and member of the University's Department of Chemistry faculty since 1973. He earned his bachelor's degree at St. John's University, Jamaica, NY, and his doctorate in chemistry from the University of Wisconsin-Madison. Prior to his appointment at the University, he held a Teaching and Research Fellowship at the University of California at Davis for two years. During his tenure as Vice President, research expenditures at the University have increased from \$44 million to \$134 million. It is obvious to anyone who has known Phil that he will not be "retiring." Instead, he intends to continue to work on projects, enhancing public and private research partnerships to bring NDSU-developed technologies to the marketplace.

Kelly Rusch joined the Louisiana State University Department of Civil and Environmental Engineering faculty in 1993, where she has spent the majority of her career focused on microorganism system design, development and modeling, and engineering education. She currently leads a research group focused on microalgae-cyanobacteria consortia for biofuels and bioproducts production. This work was recognized in 2008 by the Aquacultural Engineering Society Superior Paper Award and through two pending patents. She has secured more than \$15 million in research grant funding as a principal or co-principal investigator. She earned her bachelor's degree in biology and chemistry at the University of Wisconsin-LaCrosse, and her master's degree and doctorate in civil engineering with emphasis on environmental engineering at Louisiana State University. "I am truly honored to have been selected as the next Vice President for Research and Creative Activities at NDSU," Rusch said. "The excellent foundation built by Vice President Boudjouk, the growing research, innovation and creative activity portfolio of NDSU and the vibrant North Dakota economy make this a very exciting time to be joining NDSU. I look forward to developing and implementing a shared vision that allows all constituents of the innovation enterprise to reach the next level of excellence."

"Vibrant North Dakota economy" correctly describes the current economic situation in North Dakota. In case you haven't heard, for the third consecutive year North Dakota had the fastest economic growth of any state in the country. It also led the nation in both total population and employment growth last year. After Texas, North Dakota is now the second largest oil producer among all 50 states. Agriculture and construction are booming, and North Dakota's unemployment rate has been below 4% – the lowest in the United States – for each of the past three full years. As noted in *USA Today*, North Dakota's GDP growth rate was 13.4% this last year, its one-year population change 2.2%, and its one-year employment growth 3%. ND leads the nation in all of these areas.

While this hasn't lead to a corresponding increase in higher education funding in North Dakota, we have been able to avoid the cuts suffered by many public institutions over the last several years. NDSU will receive an additional \$6.4 million in funding this next biennium from the state; unfortunately, current needs are much greater, and there will be another tuition increase. However, our department has grown and improved dramatically over the last several years. I hope we can continue this trend in the future.

The most gratifying aspect of being a faculty member in our department is to work with our majors. We have had a steady stream of very strong students, some of whom have distinguished themselves by being awarded prestigious scholarships. For example, Cody Gette, who is currently pursuing graduate studies in astrophysics at the University of Bonn, Germany, received the Astronaut Scholarship Foundation Scholarship two years in a row before he graduated in 2012, and Aaron Feickert was the first student in North Dakota to ever receive the Department of Defense SMART Scholarship in 2009. This year, Brandon Johnson, an NDSU senior majoring in Physics, Mathematics, and Music, was awarded an Astronaut Scholarship for the 2013-2014 academic year. A number of our recent graduates have also gone on to attend graduate school at institutions such as Ohio State University, the University of Minnesota, SUNY Stony Brook, Carnegie Mellon University, and Cornell. We are very proud of their accomplishments, and look forward to continuing to provide our students with the support they need to achieve their potential.

I should also mention that this is my last newsletter. I will be retiring this August. I have really enjoyed my tenure at NDSU and like to think that we have laid the foundations for further growth and improvement in program quality. I would like to give special thanks to our administrative assistant, Patty Hartsoch, who runs the department, and our laboratory technician, Paul Omernik, who runs the labs and provides IT support. Without them I would have been lost. Sylvio May has been associate chair the last two years and will serve as interim chair until a new chair is chosen in autumn.

As usual, I would like to reiterate that we are particularly interested in developing a closer relationship with our physics alumni, and want to use this newsletter as a venue for you to communicate information about your life, career, and family to friends from your time at NDSU. Please provide the department with news for our next newsletter.

Finally, I would like to personally thank all of you who have contributed to one of the department funds that have enabled us to recognize outstanding undergraduate scholarship. Further information regarding these funds and scholarships are provided in the body of this newsletter. Please continue to provide support for these very important scholarship funds.

I encourage all of you to send us a note about your life after NDSU and to come by the department when you are in the area. We would enjoy showing you around and sharing stories about physics and NDSU.

Daniel Kroll, Department Head
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<p><i>NDSU Department of Physics Newsletter</i> <u>Editorial Staff</u> Landon Bladow Patty Hartsoch Daniel Kroll Sylvio May</p>

What NDSU Physics Has to Offer

The Department of Physics at North Dakota State University provides a rigorous education in physics and its applications. Students acquire knowledge and skills that provide a deeper understanding of nature, ranging from the physical laws' inherent beauty to the latest technological opportunities. We foster a climate of creativity, critical thinking, and investigational curiosity, where students thrive and instructors care. Being part of a research university allows our students to become involved in first-class research projects; i.e., design and perform experiments, develop modeling concepts, and perform computer simulations. Our threefold departmental research focus on soft condensed matter, polymer physics, and physics education research provides a unique environment that students and faculty alike find inspiring and fulfilling.

DEPARTMENT NEWS

Faculty & Staff Awards

Hartsoch Receives Staff Recognition Award

Daniel Kroll

Quite literally, our Administrative Assistant Patty Hartsoch runs the department. It is hard to imagine how we could function without her. In the words of one of our faculty, "...I can attest that...she is one of the most critical people to the successful functioning of the department. ...She takes her job seriously, takes pride in her work, and contributes to the success of NDSU on a daily basis through the manner in which she approaches and deals with her many responsibilities." This year she was the recipient of an NDSU Staff Recognition Award in the Office Support category, presented at the annual Employee Recognition Luncheon on April 12, 2013. The whole department nominated her, and we are delighted that her contributions to the program have been recognized.



Hartsoch receives her award from NDSU President Dean Bresciani. Photo courtesy of NDSU Staff Senate.

Patty has an open, friendly personality, and she cares about the people she works with. Everyone gets along well with her and likes her; this, coupled with her competence and work ethic, makes her a very effective Administrative Assistant. One of our faculty expresses it well: "Patty is just a fun and caring person who brightens my day."



Kryjevski Receives Accolades for Research

Daniel Kroll

Research Assistant Professor Andrei Kryjevski received the Dell-Intel Young Investigator Award at the 53rd Sanibel Symposium, February 2013. The Sanibel Symposium, organized by the Quantum Theory Project of the University of Florida, is the longest running, privately organized meeting in the field of the quantum theoretical treatment of electronic structure, spectra, and dynamics. Andrei also received the Second Place Best Paper award at the 2013 IEEE EIT (Electro/Information Technology) International Conference, held in May in Rapid City, SD, for his invited contribution entitled "Spatially Non-uniform Field Response in Arrays of Silicon Quantum Dots: DFT Computation."

Kryjevski receives the Young Investigator Award.

Research, Education, & Events

Faculty Member Leads First REU Program of its Kind

Warren Christensen

The National Science Foundation has a long tradition of providing undergraduate students with a rich research experience within the sciences prior to graduation. The Research Experience for Undergraduates (REU) Program aims to place budding scientists on a trajectory that leads to post-graduate degree programs. The Collaborations in Discipline-based Education Research (CiDER) faculty at NDSU, consisting of education researchers in the fields of Biology, Biochemistry, Physics, and Learning Analytics, led by PI Warren Christensen (Assistant Professor in Physics), assembled a proposal that focuses on the growing field of Discipline-Based Education Research (DBER). DBER investigates the learning and teaching of the STEM disciplines at the undergraduate level. Our Growing Up STEM REU was funded this past fall to the tune of \$330,000 over the next three years. Thanks to an extensive recruiting effort by Co-PI Jennifer Momsen (Assistant Professor in Biological Sciences), we selected ten participants from a pool of over eighty-five. The Growing Up STEM REU kicked off on May 28, 2013, with undergraduates researchers from across the country. Students in the program hail from Illinois, Kentucky, Maryland, New Jersey, and Washington.

The projects that our students are engaged in are as diverse as the students themselves. Zach Krakower, a physics major from the University of Maryland, is working with Warren Christensen to investigate if students interpret certain problems as either a physics or a mathematics problem and how that affects their ability to solve the problem correctly. He's investigating problems in Linear Algebra with students that have taken Quantum Mechanics. Mary Derting, a biology major from Murray State University in Kentucky, is working under Erika Offerdahl in the Department of Chemistry and Biochemistry analyzing representations in textbooks. REU participants take part in weekly seminars that focus on the development of professional skills such as keeping a scientific journal, giving research presentations, and writing papers for peer-reviewed journals. They also presented their work jointly with the Chemistry/Biochemistry REU program at a research symposium on Friday, August 2, 2013, in the NDSU Memorial Union.

New Double Major Program: Computer Science & Physics

Given the increasing relevance of physics to computer applications (e.g., computer animation) and the continuing rapid growth in the field of computational physics, the Departments of Physics and Computer Science have collaborated to offer a double major in Computer Science and Physics. Including most of the core courses of the major programs in each department, the new program addresses a demand for students with interdisciplinary training. Graduates will be prepared to work as computational scientists or software engineers, or to pursue graduate studies in either discipline.

Science Outreach Events

Alan Denton

It's been a busy year for science outreach out on the edge of the prairie. The Physics Department staged three Science Fun Nights at local schools: Longfellow Elementary School (Oct. 11, 2012), Horizon Middle School (Jan. 24, 2013), and Horace Mann-Roosevelt Elementary School (April 11, 2013). At these events, NDSU volunteers (Physics faculty and students from several departments) facilitated a variety of hands-on science activities and demonstrations for upwards of 300 students (plus parents). Facilitators included about 20 students enrolled in our introductory Physics Recitations. A generous grant from the NDSU Development Foundation Centennial Endowment Fund, to support incorporating outreach into the curriculum, enabled us to support teaching assistants to help train the recitation students, and also allowed us to purchase supplies and equipment for activities and new demonstrations.

In June, two Physics faculty members participated in the EPSCoR-funded NATURE (Nurturing American Tribal Undergraduate Research and Education) Summer Camp. During the first week, Andrew Croll and Alan Denton gave presentations to the students, introducing them to the Department. In the second week, Andrew and Alan each mentored a student through a short project in South Engineering – from pattern formation in driven granular matter to science outreach. At the end of the camp, the students presented their projects to

the entire group. Two alumni of the NATURE program, Craig Brown and Ryan Brown, who worked with Andrew and Alan two years ago, will be engineering majors at NDSU this fall.

A number of Physics faculty and students also volunteered their time this spring to serve as ND State Science Olympiad event facilitators and as Regional and State Science and Engineering Fair judges.

Faculty Members Present Science Cafés

Science Cafés, sponsored by NDSU's College of Science and Mathematics, feature a presentation by a scientist and time for discussion with the scientist and other attendees. They are free and open to the public. This past academic year, two physics faculty members were presenters.

Assistant Professor to discuss 'Why Stuff Sticks' at September Science Café – NDSU News, 9/6/12

Andrew Croll, assistant professor of physics at NDSU, is scheduled to present the September Science Café, titled "Why Stuff Sticks: Geckos, Bugs, Nanotechnology and the Quest for Really Good Duct Tape," on Tuesday, Sept. 11, 2012, from 7 p.m. to 8:30 p.m. in Stoker's Basement, Hotel Donaldson.

The talk will discuss the background behind modern adhesives and then explore the differences in how adhesion is accomplished by natural organisms such as the gecko. Topics will range from fundamental physics to engineering, nanotechnology and biology and will end with a look at the future for the modern gecko-bioinspired adhesives.

"Wouldn't it be great to be Spider-Man and climb up a building?" Croll said. "If geckos can do it, why can't we? The Spider-Man effect wows people, but the basic idea is for scientists and engineers to look at the abilities of creatures and be able to scale it up."

Why things stick has significant practical applications. Not only is there a considerable adhesives industry, but adhesion forms one of the biggest limitations on the design of nanotechnology, which is the science of manipulating materials on an atomic or molecular scale, especially to build microscopic devices. A nanometer is 10,000 times smaller than the width of a human hair.

"In general, nanotechnology means something created by humans, but this is not always the case," Croll said. "The shiny colors of many insects are natural nanotechnology, as are the structures formed on gecko toes that allow them to stick."

Stickiness limits nanotechnology design because nano-sized objects almost always stick to each other, Croll said. "Because of this stickiness we can't just shrink down large things, such as gears, because the physics is different from our everyday large-sized lives."

Croll said part of the solution to overcoming such issues could be found by mimicking nature. "A nice analogy is that for much of history, mankind was interested in flight," he said. "We looked at birds and said, 'they have feathers so, clearly, you need feathers to fly.' That isn't quite true – it's the wing that is important. It's similar to how we make discoveries in modern adhesives."

Science Café to poke holes in perceptions of poker – It's Happening at State, 1/15/13

In a smoky back room, eccentric and wild gamblers sit around a table with stacks of chips and cash. In a major casino, a televised tournament puts millions of dollars on the line. Sunglass-wearing players go all in after seeing two cards. Both scenarios represent common perceptions of how poker is played, according to Warren Christensen. But in reality, the game is something quite different, he said.

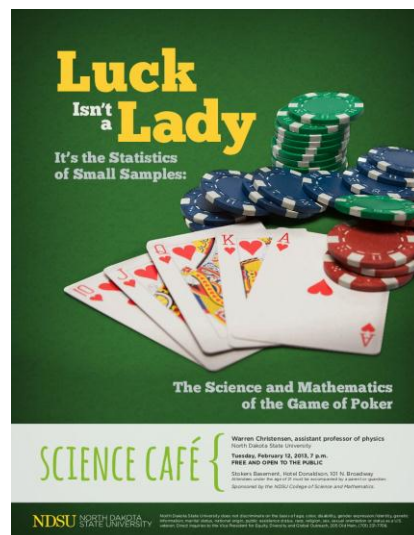


“Most people associate poker with luck and gambling,” he said. “These portrayals misrepresent how poker is actually played by professionals, and leads to the perception that it is ‘just gambling’ like blackjack or roulette.”

Christensen, assistant professor of physics, will present “Luck Isn’t a Lady, It’s the Statistics of Small Samples: The Science and Mathematics of the Game of Poker,” on Tuesday, Feb. 12, 2013, at 7 p.m. in Stoker’s Basement, Hotel Donaldson.

Christensen has been passionate about playing poker for more than 20 years. He will provide a look at modern-day poker, and how players use mathematics, as well as insights from science, to outplay their opponents. Christensen also will discuss why many people misunderstand the game and how it has led to heavy state and federal restrictions on how it can be played.

For more information on upcoming and previous Science Cafés, which are held monthly in downtown Fargo, visit <http://earth.physics.ndsu.nodak.edu>.



In other seminar news, Assistant Professor Landon Bladow was invited to give the science presentation at the 2013 College of Science and Mathematics Honors Day scholarship ceremony on May 3, 2013. His talk was entitled “The Composition of the Universe: Exploring the ‘Dark Side’ of Physics,” in which he explained the roles of dark matter and dark energy in the universe, along with the surprising finding that 96% of the mass-energy in the universe is attributed to these mysterious forms.

The New Reality

Bakyt Shalabayeva

Bakyt Shalabayeva, an Associate Professor in the Department of Fundamental and Applied Mathematics at Gumilev Eurasian National University (Astana, Kazakhstan) has been visiting the Department of Physics for six months. Her visit is supported by the international scholarship program Bolashak. This is Bakyt’s first visit to the United States. In the following she shares some of her impressions and experiences.

Who does not dream of visiting the United States? After a long and intensive international competition conducted as part of the presidential program “Bolashak,” I was awarded the opportunity to visit NDSU in order to gain new professional experience and to establish collaborations with colleagues at NDSU.

My internship at the Department of Physics began in April 2013 and will continue through October. I am grateful to the Head of the Physics Department, Prof. Daniel Kroll, and his colleagues for this unique opportunity to learn more about the department as well as the research traditions and educational system in the US. The main purpose of my visit, however, is to establish fruitful and sustainable collaborations with my colleagues at NDSU that will continue even after my return to Kazakhstan.

During my first two months at NDSU, I learned about innovative teaching methods employed by two NDSU physics faculty, Assistant Professors Mila Kryjevskaja and Warren Christensen. From my repeated visits to their classrooms, I observed how they approach teaching by employing diverse instructional strategies aimed at helping students gain a deeper understanding of physics. I was very impressed. In addition, I attended lectures on fluid mechanics taught by Associate Professor Bora Suzen of the Department of Mechanical Engineering. The topic of fluid mechanics is of great interest to me because it is directly related to my research. I was particularly impressed by the quality of students’ work presented during a poster session organized at the end of Dr. Suzen’s course. Each student shared the results of his/her project by showing distributions of hydrodynamic characteristics of systems under study. I was also pleasantly surprised by the level of confidence that the students demonstrated while discussing their results and answering questions.

Due to the nature of my research interests, Prof. Kroll introduced me to Prof. Iskander Akhatov of the Department of Mechanical Engineering. Prof. Akhatov’s research interests are most closely aligned with mine. In order to build a productive collaboration, I shared with Prof. Akhatov the results of my own work and learned

about his. I spent 3-4 weeks reading a series of his research papers that provided theoretical and experimental overviews of his work and discussed some important details as well. Although this experience has already been both rewarding and challenging, I hope that this is just the beginning. I plan to participate in an experimental study conducted at NDSU that examines the effect of the Magnus force on the aerosol flow in a microcapillary tube.

During my internship, I have met many wonderful people. Coming to NDSU from a far away country for the first time, I needed a lot of help, assistance, and guidance on a day-to-day basis. I would like to express my deep gratitude to the Physics Department Administrative Assistant Patty Hartsoch and NDSU's International Programs staff member Tabitha Thomas. In addition, I would like to express special thanks to Daniel Kroll and Iskander Akhatov for making my stay at NDSU possible and for providing me with such valuable opportunities for my professional development. This internship improved my English and promoted my research interests, knowledge, and understanding of the modern university. America is now a positive new reality for me.

Faculty Member Named Associate Editor for *Physical Review E*

Alexander Wagner

You will all have heard the maxim of publish or perish. Anyone who has survived long enough in science to get (and keep) a faculty position must be reasonably adept at this. You come up with a good idea, you test your hypothesis, you verify it, and finally you get ready to communicate your findings with the rest of the world by sending it to a well-regarded, peer-reviewed journal. What is well-regarded is a somewhat fuzzy concept, and it depends mostly on what your colleagues think are good journals. If you are not in the field, you will most likely not know if a journal is reputable. As an aside, this is always a difficulty for college promotion and tenure committees who have to evaluate a portfolio of a faculty member in an area about which none of the members may know anything.

The term "peer review" indicates that the article you wrote will not simply be published, but instead it will be sent to some of your peers, who will then, anonymously, let you know what they think about it. If they think your paper is good, it will be published; if they have some reservations, you will be invited to make revisions; but if they do not think that the paper is any good, it will be rejected. If revisions are necessary, the process will start anew, hopefully ending with a publication for you.

As any researcher will tell you, there are different kinds of reviewers: lovely and insightful ones that love your work, nasty but still insightful ones that mercilessly point out the weak points in your paper, and the useless ones that reject your paper without appearing to have understood it. Of course there may be some reviewers of the last kind that love your work, but you will likely not mind these as much.

To make all this work, another kind of person is needed; this person is the editor. When I was offered the position of associate editor at *Physical Review E*, I knew the author's side of the story, and I had a little experience by publishing one special journal for the proceedings of the DSFD conference that we held in Fargo in 2011, but I did not fully appreciate the duties this job entails. I knew that many established researchers hold editorial positions in one of the many journals, and my colleagues at NDSU all thought that I simply had to accept the position. I was a bit daunted by the additional work this job would entail, but I was also intrigued by this opportunity. So I accepted, and in April of this year I took up my new duties as the associate editor responsible for the section of computational physics.

The job of the editor is to look at submitted papers and assess whether the paper is potentially suitable for the journal. If the author knows what she is doing, this will be an easy hurdle to pass. Then the difficulty starts: reviewers need to be selected for the paper. Clearly they should not be close friends or co-authors of the researchers who submitted their work. Also they need to be intimately knowledgeable in the specialized field, so that the author is not annoyed by an inept reviewer. Then one would like to make sure that the reviewers are fair and strict in their reviewing to ensure that the journal maintains its reputation. And lastly they must have some spare time to actually do the work of reviewing. And when reviewers decline to review a paper, alternates need to be found quickly.

Once the reviews are submitted, a decision is made to accept the paper, to ask for major revisions, or to reject the paper. This decision will normally be made directly by an in-house editor, and I do not get to see the paper again. The reviews are forwarded to the authors together with the editorial decision. This is easy if the

reviewers agree, but if they disagree, or if only one reviewer submitted a review, I, as the associate editor, need to decide how to evaluate these reports.

Even more challenging are manuscripts that are submitted as a “comment.” This is a particular kind of article where a researcher can attack a published article to point out that it is wrong. Dealing with such cases can be exciting or tedious, depending on the character of the dispute that ensues.

The experience of working as an editor so far has been very interesting. And there is one great benefit of this job: previously I only got to read articles that were directly relevant to the research I was currently doing, but now I have an excuse to read a great many fascinating articles in the area of computational physics.

Student News

Physics Major Receives Astronaut Scholarship

Alan Denton

Brandon Johnson, an NDSU senior from Hazen, ND, majoring in Physics, Mathematics, and Music, was awarded an Astronaut Scholarship for the 2013-2014 academic year. The Astronaut Scholarship is awarded annually by the Astronaut Scholarship Foundation, created by the original Mercury 7 astronauts. The Scholarship, worth \$10,000, is awarded to natural or applied science or mathematics students with intentions to pursue research or advance their field upon completion of their final degrees. According to the Foundation homepage (astronautscholarship.org), “Scholarship nominees are those students who have shown initiative, creativity, and excellence in their chosen field.” Based on his research experience and academic excellence (in a challenging triple-major program), Brandon was nominated by two Physics faculty members, Alan Denton and Thomas Ihle. Brandon is the second Physics major from NDSU to receive this prestigious scholarship. The first, Cody Gette (Astronaut Scholar in 2010-2012), is now pursuing graduate studies in Astrophysics at the University of Bonn, Germany. Brandon was also awarded the 2013 Ralph L. Pitman Memorial Award, which recognizes the senior in the NDSU College of Science and Mathematics with the highest GPA and most credit hours taken at NDSU. The Department extends congratulations and best wishes to Brandon!

Two NDSU Teams Compete in University Physics Competition

Sylvio May

Students from our department again participated in the University Physics Competition. In this international contest, undergraduate students work 48 hours at their home institution, analyzing a real-world problem and writing a formal paper. In the 2012 event, which took place November 16-17, more than 80 teams from all over the world participated. Among them were two teams from NDSU's Physics Department. Levi Remily, Austin Usselman, and Wei Kang Lim worked on the problem of finding the optimal size of a table tennis ball, one that would make the game most attractive to watch. The other team, consisting of Brandon Johnson, Marne Johnson, and Tyler Antony, determined the level of volcanic activity for Earth-like planets. Both teams performed very well and were ranked as Accomplished Competitors. More information about the competition can be found at <http://www.uphysicsc.com>.

Former Faculty News

Professor Emeritus Writes Memoir

Reprinted from *It's Happening at State*, 1/31/13

Ghazi Q. Hassoun, NDSU professor emeritus of physics, recently published his memoir, “Walking Out into the Sunshine – Recollections and Reflections: A Palestinian Personal Experience.”

Hassoun, who became a refugee in Lebanon in 1948, began writing about his recollections in 1996, and formalized the project in 1997. According to Hassoun, the book is the result of years of effort “to put the story in a coherent form, so that readers of a wide range of backgrounds can read and appreciate.”

Visit <http://ghaziqhassounphd.com/home> for more information on the book.

Hassoun, who retired from NDSU in 1998, earned his bachelor's degree in physics from the American University of Beirut and master's degree and doctorate from the University of Minnesota.

In Memoriam: Professor Hetland

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Philip Hetland, 88, of Moorhead, MN, died Wednesday, April 24, 2013, driving his car near his home of one year, Farmstead Estates. The hard snow was a blessing in stopping the car without incident.

Phil was born June 14, 1924, near Hetland, SD (Kingsbury County), to Carl and Gudrid (Vigesaa) Hetland, moving to a farm near Cooperstown, ND, with his family at age 3. He attended country school, then Cooperstown High School, graduating in 1943. He joined the U.S. Navy and was in the field of electronics, stationed at the Naval Research Lab in Washington, DC, when WWII ended. He then attended Concordia College, graduating in 1949.

On October 5, 1951, he married Lorraine Brodshaug at Horace, ND. They lived in Underwood, ND, for four years where Phil taught science, math and music and was principal. He directed a church choir there. They moved to Bottineau, ND, in 1955 where Phil had all the high school choirs and band. Great school talent resulted in award-winning groups. In 1956, Phil was offered the Engineering Dept. one-year opening at the then-School of Forestry, teaching all the classes. He was coach of the baseball team and was named coach of the year. That year he also directed the Bottineau Community Choir. In 1957, Phil was offered a position in the Physics Dept. at then-NDAC. He retired as Professor in 1986. While at NDSU, he was involved in many of the Christian youth groups on campus. He also earned a master's degree in his first years there.



Phil kept busy over the summers building a dozen homes, four on South River Drive in Moorhead, where they lived 51 years. All of South River Drive was bought out by the City of Moorhead in spring of 2012 and Phil watched all four of the homes he built being demolished because of the problems of flooding. Besides building homes, Phil was involved in many other ventures, such as originating the Ponderosa Golf Course and inventing many sports items as well as woodworking, turning out beautiful tables and benches. Phil was an originator of the Christian Encounter House, first in a home in Fargo, then buying the vacated Bethesda Church in Moorhead for more space. Many young people became Christians and still stay in touch. Phil spent a lot of time writing in journals on spiritual matters. The morning of his death he had written a paragraph on the awesomeness of God and His Creation. As a born-again Christian, though Phil preferred "follower of Jesus," he decided years ago that a funeral or memorial service was not necessary and requested such not be carried out; also requesting cremation. Phil was not afraid of death, knowing where he was going.

Preceding Phil in death were his parents and all of his many aunts and uncles. Surviving are his wife of 61 years, Lorraine; his daughter, Marcia Dahl and her husband, Steve, Cooperstown; sister, Mavis Smith, Fosston, MN; brother, Glenn Hetland, Clatskanie, OR; nieces, LaNita Ajun, Clatskanie, Nina Palubicki, Fosston, Bonnie Bope, Homestead, FL, Carol Barner, Ontario, Canada; nephews, Scott Barner, Sandy, UT, Craig Hetland, Rocklin, CA, Marty Hetland, Canyon Country, CA, Steve Hetland, San Francisco, CA; twelve great-nieces and nephews; many cousins; and brothers-in-law and sisters-in-law, Robert and Jackie Brodshaug, West Fargo, and Orten and Sandra Brodshaug, Hickson, ND.

Any memorials may be directed as the donor wishes. (Suggestions include Oak Grove High School, Fargo, Concordia College, Moorhead, or Dakota Boys and Girls Ranch, Fargo.)

Condolence notes may be sent to Lorraine at 3433 28th Street South, #306, Moorhead, MN 56560 or Marcia Dahl at 11951 5th Street SE, Cooperstown, ND 58425.

AWARDS, SCHOLARSHIPS, & GRADUATES

Eivind Horvik Memorial Award: A cash award of \$150 plus a recognition certificate for the best overall performance in the calculus-based physics sequence. The recipients' names are recorded on a permanent plaque in the Physics Department office. Funds are provided by friends and associates of Eivind Horvik.

2012 Horvik Award Winners: Matthew Congrave & Derek Miller

Sinha Family Scholarship: Initial funds to support this endowment in the amount of \$5,000 were provided by Dr. and Mrs. Mahendra K. Sinha in memory of Mr. and Mrs. Pratap Narain, the parents of Dr. Mahendra K. Sinha, Emeritus Professor of Physics. It is understood that the recipient of this award will meet the following preferred criteria: (1) Be properly enrolled at North Dakota State University at the time of application and disbursement. (2) Be a Physics major with Junior or Senior standing. (3) Special consideration should be given by the selection committee to the applicant's academic merit and financial need.

2012 Sinha Scholarship Winners: Marne Johnson & Peggy Willenbring

Physics Achievement Award: Up to four awards will be made annually to Physics majors based upon their academic performance. A minimum GPA of at least 3.3 is expected, but more emphasis will be given to excellence in Physics and Mathematics and distinction in undergraduate research. Awards may be extended for one additional year, subject to excellent performance and availability of funds.

2012 Physics Achievement Award Winner: Brandon Johnson

2012 Donors

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Michael Reich and Cherish Bauer-Reich
Craig and Brenda Semler
Darrell and Carol Strobel
Dennis and Sandra Whitson

The Department of Physics wishes to thank all donors who have contributed to our scholarship programs. You are making a significant difference in the lives of our students.

2012 – 2013 Graduates

Marne Johnson (B.S. Spring 2013)

Post-graduation plans unavailable at the time of this printing.

Goetz Kaehler (Ph.D. Spring 2013)

Goetz successfully defended his Ph.D. thesis, "Fluctuations in the Lattice Boltzmann Method," on Nov. 7, 2012. His advisor was Dr. Alexander Wagner, Associate Professor of Physics. He is now joining the Physics Department of the University of Bari, Italy, as a postdoctoral research fellow to investigate cavitation phenomena in confined geometries by means of the lattice Boltzmann method.

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