Learning Through Research

a rich tradition, a bright future

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the future with Hope College

Photos courtesy of Ballinger & Associates, Hope College Public Relations and The Joint Archives of Holland.
As science continues to evolve, the classes at Hope College are following suit.

The lines between the traditional sciences are blurring. In the past, people were looking at questions from the classical disciplinary mode. Now more complex questions are bringing the disciplines together.

“Interdisciplinary questions came up as science evolved,” explains Dr. James Gentile, dean for the natural sciences at Hope. “Now virtually all the questions occur in the fuzzy boundaries — where chemists, biologists, and physicists have to come together and talk to each other.”

Accordingly, classes like biology, physics, and chemistry are meshing together.

Gentile says cross-disciplinary connections in the classroom just make sense.

“No research scientist would use the tools of the 1920s to address the problems of the current century,” he explains. Similarly, teaching techniques must evolve.

This sentiment is echoed in the national “Bio2010” report which provides a blueprint for bringing undergraduate biology education up to the speed of today’s research. It provides recommendations for teaching the next generation and advocates integrating other disciplines into the education of biology students, and using teaching techniques that build students’ interest in science, such as involvement in research — approaches already emphasized at Hope.

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Students in the geological and environmental sciences work together on dinosaur fossils.
Hope College will celebrate its new science center with a day of dedication that will feature a variety of activities. Built around the theme “Learning Through Research,” the events will take place on Friday, Oct. 8, in conjunction with the college’s Homecoming Weekend. The day will feature a series of addresses by invited speakers, a dedication ceremony and an open house.

The public is invited. Admission is free.

The presentations will begin with a keynote address by Dr. Judith Ramaley, assistant director in the Education and Human Resources Directorate of the National Science Foundation. She will present “Science and Citizenship: The Importance of Public Understanding of Science” at 9 am in Dimnent Memorial Chapel.

Two sets of parallel presentations by Hope alumni will take place at 10:15 and 11:15 am.

Presenters at 10:15 am will include Dr. Sylvia Ceyer, a 1974 graduate from Cambridge, Mass. and professor of chemistry at the Massachusetts Institute of Technology; Dr. Tim Laman, a 1983 Hope graduate from Cambridge, a research associate of the Arnold Arboretum at Harvard University and a wildlife photographer; and Dr. Paul Schaap, a 1967 graduate from Grosse Pointe Park and president of Lumigen Inc.

The presenters at 11:15 am will include Dr. Jim Serum, a 1965 Hope graduate from West Chester, Pa. and president of SciTek Ventures; and Dr. Robert Motzer, a 1977 Hope graduate from Ridgewood, N.J., an attending physician with the Sloan Kettering Cancer Center and a professor of medicine at Cornell University, both in New York City.

In addition, Hope alumni physicians will participate in panel discussions at both times.

A dedication ceremony will take place at 12:30 pm at Van Andel Plaza, north of the building’s main entrance. The scheduled participants include Dr. James Bultman, president of Hope; US Representative Pete Hoekstra or his designee; Ramaley; William Gustafson, president of Ballinger & Associates, architects for the project; Dr. James Gentile, dean for the natural sciences at Hope; Dr. Leah Chase-Waller, an assistant professor of biology and chemistry at Hope; and Jennifer Yamaoka, a senior biology major at Hope from Zeeland. The Rev. Paul Boersma, who is the Leonard and Marjorie Maas Endowed Senior Chaplain at Hope, will offer a dedication prayer.

An open house will begin at 1:15 pm and will feature refreshments throughout the center.

In addition to the activities scheduled for the new building, a dedication ceremony has been scheduled on Thursday, Oct. 7, for the college’s new Pelletron particle accelerator and attached microprobe facility. The ceremony will take place at 5 pm on the lower level of VanderWerf Hall, with Dr. Graham Peaslee, an associate professor of chemistry and geology/environmental science, presiding. The instrument, funded through a grant from the National Science Foundation, was installed this summer.

A dinner in conjunction with the dedication activities has been scheduled for the college’s Board of Trustees on Thursday, Oct. 7. Invited speakers will include Margaret Riecker, president of the Herbert H. and Grace A. Dow Foundation, which made a leadership gift in support of the science center project.

A dedication ceremony will take place on Friday, Oct. 8 at 12:30 pm at Van Andel Plaza, which north of the building’s main entrance.

The $36 million science center project, part of the college’s “Legacies: A Vision of Hope” comprehensive campaign, includes both the construction of a new, 85,900 square foot building and the renovation of the existing, 72,800 square foot Peale Science Center, which had opened in 1973. Construction began in March 2002 and the new building opened for the beginning of the 2003-04 school year. The Peale renovation was completed in time for the start of the current school year.
Gentile was the only representative of a liberal arts college on the hand-picked, 11-member team that wrote the report. “We have to train future scientists in the way the future of science is going. It’s a road map for colleges and universities,” he says. “Hope College is following that road map and moving rapidly.”

Hope has already been modeling many of the national report’s recommendations and the new Science Center was designed with cross-disciplinary connections in mind. The building houses the departments of biology, chemistry, geological and environmental sciences, nursing and psychology.

“Classic structure has biology on one floor, chemistry on another, and physics on another,” notes Gentile. This building is constructed to promote interdisciplinary learning. “Top floor is molecular world sciences, the environmental sciences are on the second floor, and the bottom floor is human sciences and the museum.”

There’s an atrium in the middle where students and staff can gather informally. Students and faculty members from different disciplines also find themselves cluttered around a common instrument, working on different experiments.

“It forces conversation and new ideas,” Gentile says. “They rub shoulders as they wait for samples. They learn from each other. The students’ casual social structure of research is captured by the structure of this building.”

The cross-disciplinary approach to teaching, along with the new Science Center, will better equip Hope students to address complex questions, think in a complex way, better understand how other people think, and help them learn how to work in teams.
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Hope College Science Center
The Science Center at Hope College is for the birds. Well, a portion of it anyway.

An impressive collection of well over 100 ducks and geese, representing every species of waterfowl in North America, is displayed on the third floor landing in the building’s main atrium. Much of the display is visible from both the landing and the main floor below. There is an additional glass case display near the biology museum on the first floor.

“The completeness of the collection makes it so unique,” explained Lori Hertel, director of biology laboratories. “There are male and female specimens; and there’s even examples of the same species in different stages of life.”

The extensive collection, donated by the late Dr. Jack Moermond, is not only used as a teaching tool for Hope College students, but also as a community outreach tool.

“Reaching out to the community is part of the mission of this college,” Hertel said. “Education isn’t valuable if we hold it to ourselves. We have to share that knowledge.”

Hertel said that many people in the community, from school children to DNR rangers, will benefit from the waterfowl collection.

“You can see the subtle differences,” she noted. “Pictures are nice but they don’t capture it as well as the real thing.”

Students are also seeing “the real thing” in the Science Center’s museum. The museum has a variety of live animals, animal skeletons and geological exhibits. Hertel hosts tours for pre-school, elementary school, middle school, high school, and even alternative education programs for college-age students. The tours are free.

“They can come here and touch the animals and see living examples. It’s a more total learning experience,” Hertel said. “Research shows that kids learn better, the more senses are involved. They can feel if an animal has scaly skin or slimy skin. They can learn about their habitats and understand why animals are the way they are.”

With the completion of the new Science Center and the renovation of the existing Peale Science Center, Hertel noted that the museum is at least twice as big in terms of functional space.

“That means we’ll have more children come through here without sitting on each other’s laps,” she said laughing. In the old space, Hertel saw over 2,000 children in one year. She is looking forward to another year of school tours at the museum.

“Kids at that age are naturally curious,” she said. “People need to learn and understand science, and it’s important to get kids interested in science early and pique that curiosity.”

Interest in the sciences is elevated to a whole new level through science camps and clubs that run during the summer and throughout the school year at Hope. This past summer, the college hosted 22 camp sessions for children in grades K-9. Over 625 children attended camps that included a CSI camp for crime solving, an ER camp for the health professions, a space and rocketry camp, a Lego robotics camp, and a dissection camp.

“There’s a lot of hands-on creative-type things,” explained Tod Gugino, director of chemistry laboratories and science camps. “But we try to, even with the younger kids, do a pre-lab lecture to give them the science behind what we’re doing. Then we get our hands dirty!” Some of the things campers busy themselves with are building mock habitats and designing and building robots.

Campers are taught about scientific methods, including how to observe problems, create a hypothesis, test it, take a look at it again, and decide if the experiment needs modification... “It’s a scientific process in a fun setting,” Gugino noted.
By Carrie Rietsma
Specialty Publications Writer

Pairing students and professors together to work on a research project isn’t rocket science — it just makes sense.

Hope College uses collaborative research as a teaching technique in many disciplines, including the sciences. Students at Hope often participate in original research experiments alongside their professors. Unlike the traditional teaching from a science book or a research paper, hands-on learning is a more timely — and often more effective — way for students to learn about and understand the complex and ever-changing world of science.

“By the time a research paper is published, it’s already six months out of date. And by the time a book is published, it’s already years out of date,” notes Dr. James Gentile, dean for the natural sciences at Hope. However, professors who actually conduct a research experiment and simultaneously teach, are giving their students the advantage of experience and cutting-edge education.

Collaborative research is not a new concept at Hope College. Dr. George Zuidema, a 1949 Hope College graduate, recalls spending his summers working in chemistry research with Professor Gerrit Van Zyl.

“I learned how to use the science library, how to write a scientific paper, send it in and have it get accepted. It taught me how to figure out problems and think on my own — lessons that were helpful in medical school and all my life.”

Hope has earned recognition for its science instruction on a variety of measures through the years. In 2003, the college tied for fourth nationally in the “Undergraduate research/Creative projects” category in the “America’s Best Colleges” guide published by US News and World Report for its success in teaching through active learning. Hope was also named to the listing in 2004 and 2005.

The college’s science program was recognized as a “Program That Works” by Project Kaleidoscope of Washington, D.C. and identified as a model for other institutions to consider.

Other colleges may be considering the new Science Center as a model, as well. The building is equipped to better facilitate the flow of collaborative research.

“The labs are connected internally by doors so you can cross back and forth and form partnerships with other students and faculty members,” says Gentile.

The college also boasts computer technology throughout the building and other high-tech equipment.

The Science Center and the collaborative research program will continue to better prepare students for life in the real world.

But Gentile adds that it goes both ways.

“We learn as much from the students as they learn from us.”

Hope College uses collaborative research as a teaching technique in many disciplines.
By Esther Martin-Hayes
Special to The Sentinel

Last May, Hope College’s nursing department proudly presented degrees to their first graduating class. Previously, the school operated a joint nursing education venture with Calvin College in Grand Rapids.

The accomplishment can partially be attributed to the increased opportunity made available at the new science center. Last fall, the nursing department moved from one of the small cottages on campus to join other science majors in the 15,000 square foot skills-lab and learning center.

“It’s much larger and better equipped with all of those things necessary for our students to become professional nurses,” said Debra Sietsema, assistant professor of nursing and chairperson for the department.

In just one year, Sietsema says moving the
nursing program to the science center has produced immediate results.

“It has really assisted us in putting Hope College’s signature in the education of nursing students,” she said. “And it has allowed us to enlarge the program which is important from a social standpoint because we will be able to graduate more students.”

Prior to moving to the new facility, space was limited making it difficult to grow the program. Since the move, the department of nursing has already seen an increase in the amount of applications they receive from individuals wanting to be admitted into the program.

The advantages include interdisciplinary opportunities such as increased research projects and simulated settings that are designed to develop a variety of skills, ultimately making it easier for students to gain clinicals (internship opportunities).

“Now we’re amongst others within the science center allowing for collaborative research,” Sietsema said.

Labs include hospital and clinical settings, with every machine functioning as it would in real life situations.

“Now the students can assess problems and use their critical thinking to work through issues that arise by using these machines in mock situations,” Sietsema added.

The high-tech simulation machines include a virtual reality computer that is used to teach students how to start IVs before they are allowed to work on a real patient.

Upon completion of the program, Sietsema says students will be equipped to obtain employment in their field of study all over the world.

Graduates from the college’s first class have been hired in various locations, including Maine, California and Colorado and one student was immediately invited to join the emergency department staff at the highly reputable Children’s Memorial Hospital in Chicago, IL.
The Science Center at Hope College is built on a strong historical foundation of learning, with the future of science in mind. The new complex is bursting with technological advances and the building is designed to better facilitate communication throughout departments, cross-disciplinary teaching and collaborative research.

“I think it’s absolutely fantastic,” Dr. George Zuidema remarked about the new Science Center, which includes the renovation of the Peale Science Center and an 85,900 square foot new
addition. “I’ve seen a lot of science buildings in my day but never one that so adequately marries architectural beauty with function.”

Zuidema graduated from Hope College in 1949. He is retired from a distinguished career in medicine and higher education, which included serving as chief of surgery at Johns Hopkins and vice-provost for medical affairs at the University of Michigan. Zuidema is one of many success stories that have come out of Hope’s rich science program.

“I was privileged to have some terrific teachers,” he said. “Once I was exposed to the sciences, they captured my interest and I decided to go to med school.”

Teachers like J. Harvey Kleinheksel and Gerrit Van Zyl had a dramatic influence on students, like Zuidema, and the science program as a whole. The Science Center’s main atrium is named in part for them.

Van Zyl, who taught chemistry from 1923 to 1964, is widely recognized for developing research-based learning at Hope in its modern sense. He involved many students, including Zuidema, in his active research program.

“I spent the summertime in research with Van Zyl in chemistry,” Zuidema explained. “I learned how to use the science library, how to write a scientific paper, send it in and have it get accepted. It taught me how to figure out problems and think on my own — lessons that were helpful in medical school and all my life.”

During Van Zyl’s term as Hope’s chemistry department head, the program flourished. During this time, 125 chemistry graduates earned PH. D degrees in chemistry. Although Van Zyl was not known for being a dynamic lecturer, he taught his students, more by actions than words, that chemistry was important and worth all the time and effort he required of them.

Dr. Irwin Brink, professor of emeritus of chemistry, wrote about Van Zyl in “A brief History of Science at Hope College.”

“Van Zyl, known affectionately by his students as ‘Little Doc’ because of his diminutive stature, was a quiet spoken, informal, energetic man, whose mischievous brown eyes betrayed his love for humorous stories which he sprinkled among his chemistry lectures,” Brink wrote.

“Van Zyl’s success in making Hope known in the world of chemistry and in earning the loyalty of his students was based on a strategy of making and maintaining personal contacts.”

Zuidema said Van Zyl kept close track of all his students who went on to graduate school.

“He had a little filing cabinet with index cards that he would update all the time,” he said. “Students loved him and kept in touch.”

Students were also very fond of Kleinheksel, who was hired in 1928 to teach chemistry and biology.

“He was one of the best teachers I ever had,” Zuidema said. “He knew his students by name the day they walked into class. His presentations were clear, and he expected you to do your work. He was a great human being and he really cared.”

Kleinheksel was a striking contrast to Van Zyl in terms of his tall stature. Students called him “Big Doc.”

Brink wrote the following about Kleinheksel: “Precisely as the bell rang to announce the beginning of the class period, Kleinheksel would enter the classroom, stride to the front of the room, and begin firing review questions at students... To be in Kleinheksel’s classroom was a memorable experience because there was something about his person, his gentle dignity and his high expectations of every student that engendered in one the feeling that answering his oral questions correctly was just about the most important thing one could do in life and to answer a question incorrectly or not at all was to betray his trust.”

“These two men, so strikingly different in so many ways,” Brink continued, “formed one of the most effective teaching teams in undergraduate chemistry anywhere.”

The teaching quality at Hope College continues to flourish.

“We’ve had a great faculty over the years,” added Dr. James Gentile, dean for the natural sciences. “We have people who have had numerous achievements. The hiring has been very intentional.”

Gentile also gives credit to the past and present Hope College presidents.

“Presidential leadership deserves a real set of kudos,” he said. “This is sacred, it’s important, and they’ve kept it going.”
Hope College’s psychology department has long been known for facilitating active learning – and the new science building has been key in further developing that style of education.

Since the department moved into the building in August, associate professor of psychology Dr. Charlotte vanOyen Witvliet says their students have already benefited from the specially designed classrooms, equipped with multi-media technology, state-of-the-art labs and research suites.

“This is a good home for us to hone our practices,” she said. “The classrooms are much more fully integrated and are equipped with all the multi-media technology necessary to better facilitate learning.”

The advantages of the science building to the psychology department are innumerable. The research suites found in the new building provide undergraduate students with the environment for research opportunities that in other universities would only be reserved for graduate students. Thanks to the new facilities, more undergraduates are able to participate in student/faculty research and even co-author projects.

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facilities, more undergraduates are able to participate in student/faculty research and even co-author projects.

“Every one of our faculty members has an active research program and all of us mentor students,” Witvliet said. “These students are receiving good training and exposure and are being treated as active contributors whose work is recognized. It’s a dimension that is often not the case in other undergraduate programs. It’s a mark of distinction.”

Observation is another important aspect of psychological studies. One-way mirrors found in certain rooms of the new science building have proven to be an especially useful tool for developing the observation skills of their students. Much like professional clinical observation settings, the labs make it possible for students to observe behavior and make assessments in a way that is non-intrusive and non-threatening.

Psychology faculty also appreciate the building’s several classrooms that can be condensed into smaller breakout rooms for the purposes of group discussion, then easily readjusted to larger rooms to accommodate lectures and larger class sizes.

By having the natural science, health science and behavioral science majors all under one roof, Witvliet says the new Science Center also promotes interdisciplinary study.

“By having everyone close together and intermingled, students are realizing that we (the various departments) do need each other,” she said.

The Science Center has also been key in the psychology department’s development of a neuroscience minor.

“It’s an exciting thing for us,” Witvliet said. “And it’s sure to have a lot of interdisciplinary benefits.”

Since the move in August, students have already benefited from the specially designed classrooms, equipped with multi-media technology.

Above all, the faculty, staff and students of Hope College’s psychology department believe that the benefits of new science center will set students down a path that will not only lead them to graduation, but prepare them for thriving careers, meaningful graduate study and more.
Lessons the Hope Way

Building tomorrow’s leaders, one person at a time.

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