ECE Department Looks Back at Its First Graduates

May 2010 marks 100 years since the first degrees in electrical engineering were awarded from Colorado State University. In 1910, the department was young and the classes were small. The first graduating class boasted six students, who were heavily involved in campus activities and clubs, such as the C.A.C. Prep Engineering Society and the American Institute of Electrical Engineers (AIEE merged with the Institute of Radio Engineers in 1963 to form the Institute of Electrical and Electronics Engineers).

Much like today, the department nurtured and developed close ties with industry. A majority of the 1910 graduates went to work for the private sector, namely Westinghouse Electric Company and General Electric Company. An exception was alumnus John H. Finney, who joined Purdue University and was later appointed to an assistantship in Purdue’s Department of Mechanical Engineering.

— Information courtesy of ECE Emeritus Professor Charles Britton

Centennial Celebration Planned for May 1, 2010

Mark your calendar for May 1, 2010, when the Department of Electrical and Computer Engineering will celebrate a century of innovation. All ECE alumni are invited to attend this free event. The celebration will honor our department’s rich history by paying tribute to people and projects that have made an impact over the years.

Additional information will be mailed in the coming months to all alumni and friends. In the meantime, please visit the ECE centennial Web page (www.engr.colostate.edu/ece/centennial) for more information, including a historical overview, timeline, photos, alumni information, and more.

Share Your Stories!

- **Nominate a notable alumnus** – Do you know someone who has made an impact on the electrical and computer engineering profession?
- **Send us your photographs** – Do you have photos from your time at Colorado State University? Send electronic photos by e-mail or submit hard copies of photos by regular mail to be scanned and returned to you.
- **Share your projects** – Did you participate in a cutting-edge project while you were at Colorado State? Were you involved in an exciting research breakthrough? We would like to highlight interesting and innovative projects.

For information: www.engr.colostate.edu/ece/centennial

Send your ideas, stories, and photos to:

Andrea Leland, ECE Alumni Relations Coordinator
1373 Campus Delivery • Fort Collins, CO 80523-1373
Phone: (970) 491-1033 • E-mail: andrea.leland@colostate.edu
Student Spotlight: ECE Senior Tackles Academics and Athletics

ECE senior Josh Gabler has spent the last four years tackling both difficult equations and football opponents. A computer engineering honor student, Gabler is a hard-hitting athlete and scholar. Last year, he played safety for the Colorado State Rams, while earning a 3.668 G.P.A.

On the football field, safeties are the last line of defense, expected to be sure tacklers. In the classroom, computer engineering students take some of the most rigorous courses on campus. Despite his demanding interests, Gabler has excelled at both. He is a recipient of the Claude W. Wood merit-based engineering scholarship and he lettered in football.

Between studying for exams and practicing for games, Gabler has little free time. “I don't think people realize how much studying is required for football,” said Gabler. “We spend five to 10 hours per week just watching films of our opponents, analyzing their tendencies.” A typical day for Gabler includes a morning run, classes, weight lifting, more classes, football practice, plus hours in the laboratory and a part-time job.

Gabler, who has always been an avid Rams fan, was born in Fort Collins and his father graduated from Colorado State’s math department. He later moved to Longmont, where he went to high school. Gabler knew all along that he wanted to major in engineering but did not firmly decide on computer engineering until he had taken a few classes in the major. He said he likes the challenge of solving complex problems. “When we were given a difficult assignment, I would have dreams about it,” he said. “It was all I could think about. I would wake up the next day and be thrilled when the answer became obvious.”

Gabler currently works on campus as a part-time information technology specialist for the honors department in the Academic Village, managing their web site and databases. He plans to play football again this fall and attend graduate school at Colorado State next spring. In the future, Gabler hopes to live in Northern Colorado and dreams of starting his own company. “I think of myself as an entrepreneur. I like to start and finish a project, building it from the ground up,” he said.

Optical Biosensors Design Team Wins Best Paper Contest

The ECE department announced the winner of the 2009 Best Paper Contest at its spring graduation reception on May 15. Senior design students Lauren Netherton and Joel Kindt received the award for their paper entitled, “Optical Biosensors.”

Netherton and Kindt each received a cash award and a certificate from the IEEE Denver Section and the local IEEE Solid-State Circuits Society, the sponsors of the contest. The Best Paper Contest provides students an opportunity to showcase their writing skills and compete for a cash prize. The judges, a panel of volunteers from the ECE Industrial Advisory Board and the IEEE, selected the paper for its exceptional technical content, organization, development, clarity, style, and grammar.

The Best Paper Contest is an annual competition open to all senior design students.

CSU Signs Exchange Agreement with University of Luxembourg

On the heels of the ECE department’s recent research agreement with the University of Luxembourg (UL), Colorado State University announced it will be expanding the partnership to include undergraduate students. The two universities will work together to promote internationalization by stimulating and supporting intercultural exchanges between students from the United States and Luxembourg.

The number of CSU engineering students selected for exchange will be agreed upon each year between the two institutions. It is anticipated that two to four students per year will participate in the exchange program.

UL is a young, small, and personable institution located in Luxembourg City, with an enrollment approaching 5,000 students. The university is considered an inviting locale for English-speaking students to explore continental Europe and learn a foreign language. It is distinctive from other universities in Europe in that it is trilingual. Teaching and research are conducted in English, French, and German, creating a diverse learning environment with an exceptionally large number of students, faculty, and staff from abroad.
Students Honored at 2009 Engineering Days

The following ECE students were recognized at the 2009 Engineering Days (E-Days) Awards Ceremony. Sponsored by the Engineering College Council, the annual event showcases student projects, demonstrations, and designs from all the engineering departments.

ECE Department Awards

Outstanding Senior Award
Mark Woolston

Outstanding Junior Award
Diana Peterson

Outstanding Sophomore Award
Philip Mayhoffer

Outstanding Freshman Award
Michael Martin

Undergraduate Research Award
Ryan Hoppal

Derek L. Lile Leadership Award
Keith Wernsing

ECE Outstanding Faculty Award
Anura Jayasumana and Bane Notaros (voted by ECE undergraduate student body)

Senior Design Project Awards

First Place – Antenna Test Range: Kenneth Mitchell, Tejas Tank, Steven Turner, and Mike Turner; advisers: Professors Branislav and Olivera Notaros

Second Place – Optical Biosensors: Hailey Cutler (chemical engineering), Joel Kindt, and Lauren Netherton; adviser: Professor Kevin Lear

Third Place – CMOS 65nm Process Monitor: Allen Chen, Ryan Hoppal, and Phillip Misek; advisers: Professor Hugh Grinolds and Brian Misek

Class Notes

Please send your professional and family updates to ece@engr.colostate.edu. Your news will be published in the next ECE newsletter.

John Tablewski (BS EE ’50) retired from General Electric Company, Nuclear Engineering, in 1987. He resides in San Diego, California, and has been married to his wife, Jeanne, for 51 years. They have two children and one grandson.

David Rusher (BS EE ’61) accepted an engineering position in 1961 with the Autonetics Division of North American Aviation in Anaheim, California. He worked there until his retirement in 2005. Career highlights include work on the Apollo program and Engineer-of-the-Year in 1990. He has been married since 1968 to his wife, Louise. They have two daughters and enjoy spending time with their three grandchildren.

Kenneth Morey (BS EE ’66) is a registered Professional Engineer in Colorado. His longstanding career includes 30 years with Agilent Technologies (formerly Hewlett-Packard) in Colorado Springs. He also worked for TRW Systems, Kaman Sciences, TRW Semiconductors, and Teledyne Semiconductors. Kenneth has been married for 43 years. He has four children and four grandchildren.

Dennis McClure (BS EE ’71) currently lives in the Dallas, Texas area working for JCPenney as a DB2 DBA on AIX.

Lenn Heighe (BS EE ’74) lives in Loveland, Colorado. He is director of Operations for Advanced Energy Industries. In his free time, Lenn enjoys scuba diving, hunting, photography, and woodworking.

Sri Sritihran (PhD EE ’88) is a project manager for L-3 Communications in Oklahoma City, Oklahoma.

Todd Ritterbush (MS EE ’91) traveled the country as a computer engineering consultant based in Denver. He has spent the last six years working at Sandia National Laboratories in Albuquerque, New Mexico, where he is a software systems applications developer in the Space Systems group.

Troy Butler (BS EE ’03) recently finished his Ph.D. in mathematics at Colorado State and will begin a postdoctoral fellowship at the Institute for Computational Engineering and Sciences at the University of Texas-Austin this fall.

Don Williams (BS EE ’03) currently resides in Highlands Ranch, Colorado, working as a Senior BPM Consultant for Lombardi Software, Inc. based out of Austin, Texas. In September, he will marry CSU alumna, Anne Fender.

Chariissa Duskins (BS EE ’04) works for Seagate Technology as a firmware engineer.

Jay Matthews (BS CpE ’05) accepted a position with The Boeing Company in Heath, Ohio, as a quality assurance manager.

He is currently pursuing a Juris Doctor degree at Capital University Law School in Columbus, Ohio. He said his degree and experiences at Colorado State have allowed him to pursue an education centered on Intellectual Property Law. His anticipated graduation date is May 2011.

2009-2010 ECE Scholarship Recipients

Undergraduate Scholarships

Aram Budak ECE Fellowship
  • Leah Belval
  • Alan Burgesser

Eads Family Scholarship
  • Luke Engelbert-Fenton

Edward B. House Scholarship
  • Keith Wernsing

Electrical and Computer Engineering Alumni Undergraduate Scholarship
  • Daniel Higley

Electrical and Computer Engineering Undergraduate/Graduate Scholarship
  • Craig O’Dell
  • Diana Peterson

Fry Family Electrical Engineering Scholarship
  • David Anderson

John and Amy Lawton Scholarship
  • Anthony Navarro

Lee and Bette Wehrman Scholarship
  • Wilson Foster
  • Ryan Selby
  • Kyle Dimmitt

MicroMotion Scholarship
  • Tucker Kern
  • Michael Taylor

Thomas A. Brubaker Scholarship
  • Justin Grantham

Willis T. Johnson Scholarship
  • Christopher Robbins

Graduate Scholarships

Perl Family Graduate Fellowship
  • Scott Domingue

Sjostrom Family Scholarship
  • Nada Sekeljic

Shrake Culler Graduate Scholarship
  • Yang Zhang

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Andrea Leland
Lead Writer and Editor
1373 Campus Delivery
Fort Collins, CO 80523-1373
E-mail: andrea.leland@colostate.edu
Phone: (970) 491-1033
Colorado State University is cultivating a new generation of experts in the fields of biomedical science and engineering. In addition to traditional research and scientific training, CSU graduate students representing the STEM disciplines (science, technology, engineering, and mathematics) are receiving specialized training in ethics, communication, and leadership skills that will, in turn, help them train tomorrow’s work force.

The students are funded under a new $2.7 million National Science Foundation (NSF) grant awarded to Colorado State University this year. The first class of graduate fellows began the program on June 1 and spent the summer interacting with K-12 teachers from five participating high schools in Northern Colorado.

Dr. Tom Chen, professor of electrical and computer engineering, is principal investigator on the multidisciplinary grant, collaborating with CSU professors Stuart Tobet, Michael De Miranda, Chuck Henry, and Vakhtang Putkaradze.

The first goal of the project is to advance the current understanding of how cells communicate among themselves. Chen is working with co-PI Dr. Stuart Tobet, a biomedical sciences professor, and Dr. Chuck Henry, a chemistry professor, to test new theories about how cells behave, using advanced engineering methods in microelectronics and electrochemistry.

Chen, Tobet, and Henry are core professors in the School of Biomedical Engineering in the College of Engineering. With the support of Dr. Vakhtang Putkaradze, a mathematics professor, the team will also be able to use mathematical modeling to help understand the complexities of the biological process.

In order to boost enrollments across the STEM disciplines – another goal of the project – they are equipping future scientists and practicing engineers with the skills to translate state-of-the-art research and scientific knowledge to the K-12 teachers and students. “We want to get K-12 kids more excited about science and engineering,” says Chen, “and to create some linkage between what they learn in school and what the cutting-edge science and technology is all about, so they can see how it’s actually used by scientists and engineers.”

In addition to classical laboratory research, NSF requires the graduate student fellows to work alongside teachers in K-12 schools. “Education is an important piece of the project,” says Chen. “Each graduate student fellow is paired with a mentor teacher for the entire school year, getting a first-hand look at how educators work.” De Miranda is responsible for training the graduate fellows in critical pedagogy, Colorado K-12 standards, and communication skills. De Miranda, a co-principal investigator on the grant, is an engineering education professor in the College of Applied Human Sciences with a joint appointment in the ECE department.

Involvement by industry partners is another key element of the grant. “We incorporate industry experience into these activities. For example, Avago Technologies in Fort Collins provides our graduate fellows, teachers, and students a window into how the industry works,” Chen explains. “The fellows, K-12 teachers, and their students ultimately will be able to interact with companies such as Avago to gain a better understanding of how academic research and industrial R&D can interact and mutually benefit from each other and how the knowledge taught in those disciplines is applied in industry.”

Avago is not the only company involved. ADInstruments is providing expertise in measurement equipment and technologies, and Leeds, a small biological company, is sharing their knowledge of microscope technologies.

Visit csu-gk12.engr.colostate.edu for additional information about the program or contact Tom Chen (chen@engr.colostate.edu).
Alumni Spotlight: At Age 80, Seasoned Engineer Thankful for CSU Education

With 52 years of engineering experience and a thick portfolio of technical achievements and awards, ECE alumnus Keith Struckman is still going strong. At 80, he thinks of his time at Colorado State University as a turning point in his life.

Struckman enrolled at CSU (Colorado A&M at the time) after serving in the Korean War. He barely made it back to Fort Collins in time to register for classes, but with the help of a sympathetic registrar, he signed up for the fall semester on the last day of registration without the required documents. Struckman said, “I didn't have time to obtain my high school transcript, but the registrar told me she was willing to take a chance.”

To date, Colorado State does not have a high school transcript for Struckman—a transcript that showed him ineligible for admission into electrical engineering. He had taken only two math classes at his small high school in Ord, Nebraska, and no courses in physics or chemistry. The EE department’s professors tutored Struckman and helped him through his freshman year and, despite the initial setbacks, he graduated with high distinction in 1957, earning a bachelor’s degree in electrical engineering.

Since that time, Struckman has experienced much success in his longstanding career. Considered a pioneer in the area of Direction Finding (DF), he retired at age 69 from Sanders/Lockheed Martin, where he was named an Engineering Fellow and earned the Chairman’s Award for Technical Achievement, the highest honor of its kind. He also received five other technical awards for his work and patents and was the recipient of CSU’s College of Engineering Individual Achievement Award in 1984.

Struckman continues to work part-time for BAE Systems, commuting from his home in Grand Junction, Colorado, to New Hampshire. He currently is the technical brainpower behind seven DF projects for the company.

“I believe my story speaks to the impact dedicated professors and caring administrators can have on a person’s life,” Struckman said, “and I am thankful for my education from Colorado State.”

Struckman also earned a master’s degree in electrical engineering from Northeastern University and took additional graduate-level courses at Cornell University.

Sweet Welcome-Back for Students

ECE students got their first taste of the fall semester at the department’s second annual ice cream social.

The event, which provided an opportunity for ECE students to connect with fellow undergraduates and mingle with faculty and staff, was held at the Academic Village, the new living and learning residence halls for engineering students.

Diana Peterson chats with students and faculty at the ECE department Ice cream social.

Can You Identify This Alumnus?

Can you identify the person in this photo from the annual Engineering Days celebration in 1951? Contact the ECE department at (970) 491-6600 or send e-mail to ece@engr.colostate.edu.

In August of that year, the Colorado State campus was damaged by the worst flood in its history to date. The student union was inundated with two feet of water and valuable scientific equipment was destroyed in the engineering building.

An update will be published in the next ECE newsletter.

Update: ECE alumnus Dr. Marvin Niimura (Ph.D. ’73) contacted the ECE department to identify the individuals featured in this 1970 photo. Niimura’s co-adviser, Dr. P. W. Chan, is the person in the foreground. He was an assistant professor in the ECE department at the time. Niimura did not know the last name of the student in the background but said his name is Clause. He added, “I have been carrying this newsletter since I received it, mainly because the background of this picture shows my beloved steel desk that I used every day from 1970 until 1974.”
Menoni Receives CSU Hazaleus Award

Carmen Menoni, professor of electrical and computer engineering, was honored in March by Colorado State University with the Margaret B. Hazaleus Award. CSU’s Office of Women’s Programs and Studies and the Office of Equal Opportunity and Diversity presented Dr. Menoni with the award at the Women’s Studies Celebration Banquet.

The Hazaleus awards were started to honor individuals for long-term efforts to enhance the opportunities for women on campus. Since 1997, the awards program has honored women who are role models to faculty, administrators, and students, and who break ground, as Margaret Hazaleus did, for the women who follow them.

ECE alumna Courtney Brewer, who received her master’s degree under Menoni, noted in the award nomination that Dr. Menoni has an impressive record in recruiting and mentoring CSU women and minority students. She encourages female students to participate annually to local high school students. At the elementary school level, Menoni developed a workshop called “Let’s Make Light” as part of a month-long mentoring series. Earlier this year, Menoni was named a Fellow of both the American Physical Society and the Optical Society of America.

ECE Faculty Hit Service Milestones

2009 marks 35 years of service for Dr. George Collins and 30 years for Dr. Jorge Rocca. Throughout the years the distinguished professors have firmly positioned themselves as prominent leaders in their respective fields. Both have earned much recognition for their contributions to teaching, research, and outreach in the form of countless awards, honors, citations, and published work.

Collins is a Fellow of the Institute of Electrical and Electronics Engineers (IEEE), the American Physical Society (APS), the Optical Society of America (OSA), and a Sloan Fellow in physics. Rocca is a world leader in the development of compact X-ray lasers and their applications, serving as the director of the National Science Foundation Engineering Research Center for Extreme Ultraviolet Science and Technology. He is a Colorado State University Distinguished Professor and a Fellow of the OSA, the APS, and the IEEE.

Chandra Receives Two Awards for Educational Contributions

Colorado State University Award for Instructional Innovation

ECE Professor V. Chandrasekar (Chandra) is the 2009 recipient of the Provost’s N. Preston Davis Award for Instructional Innovation. He was honored at the “Celebrate Colorado State!” awards reception in April, an annual celebration of the University’s top teaching, research, and service achievements.

Chandra, who has earned much acclaim for his innovative research, received the award for his advancements in the classroom. The Provost’s N. Preston Davis Award is presented each year to one CSU faculty member in recognition of the use of technology to further or significantly encourage instructional innovation.

IEEE Geoscience and Remote Sensing Society (GRSS) Education Award

Chandra also received the IEEE GRSS Education Award for his outstanding contributions to education in remote sensing. The award, which is considered annually but granted only when an outstanding recipient is identified, was announced in July at the IEEE International Geoscience & Remote Sensing Symposium in Cape Town, Africa. The large-scale meeting is devoted to geoscience and remote sensing, the expanding branches of science that closely monitor the health of the planet using satellites.

Chandra has made pioneering contributions in the area of polarimetric radar observations of the atmosphere both from earth and space. He is co-principal investigator of the CSU-CHILL radar facility and deputy director of the National Science Foundation Center for Collaborative Adaptive Sensing of the Atmosphere.
Research Spotlight: ECE Professors Awarded $1 Million Grant to Design More Robust Computer Systems

Lightning strikes, floods, and other natural and manmade disasters can mean life or death, and they also can devastate computer systems at times when they’re most needed.

H.J. Siegel, Tony Maciejewski, and Arnold Rosenberg, electrical and computer engineering professors at Colorado State University, have received more than $1 million from the National Science Foundation to design techniques for building robust and dependable computing and communications systems capable of withstanding major, unexpected disruptions. The team includes graduate and undergraduate students.

The grant money is made possible through the American Recovery and Reinvestment Act of 2009. The award is one of many grants that the department hopes to receive as part of the stimulus package.

“Information systems are often a heterogeneous mix of machines and networks that experience degraded performance due to such problems as machine failures, changes in workload, or other uncertainties,” said Siegel, Abell Distinguished Professor of Electrical and Computer Engineering and director of the University’s Information Science & Technology Center (ISTeC). “The goal is to bring together researchers and practitioners to collectively investigate the problem of robust computing systems.”

“Uncertainty is the enemy of a robust computer system, but this grant will help us minimize damaging failures and build computer systems that perform well through crises,” said Maciejewski, head of the Department of Electrical and Computer Engineering. “As computer systems become more integrated with everyday life, it’s really important that they continue to perform critical functions even when there’s an unpredicted circumstance.”

The grant, led by Colorado State, includes collaborators DigitalGlobe, which supplies images to Google Maps and Microsoft Virtual Earth, the National Center for Atmospheric Research, which studies prediction of severe and catastrophic weather, and the University of Colorado at Boulder.

The team will design models and mathematical and algorithmic tools to derive robust resource management schemes as well as to quantify the probability of system failures.

“The robustness concepts being developed have broad applicability, and will significantly contribute to meeting national needs to build and maintain robust information technology infrastructures,” said team member Jay Smith at DigitalGlobe.

Siegel and Maciejewski serve as co-directors of the CSU Center for Robustness in Computing Systems, which has been funded by the Colorado Commission on Higher Education Technology Advancement Group, DARPA, and another NSF grant. Siegel’s research focuses on distributed computing and communication systems, heterogeneous computing, parallel processing, computer architectures and algorithms, and interconnection networks. Maciejewski’s research and teaching interests center on the design and analysis of robust systems, including fault-tolerant robotic systems for operation in hazardous or remote environments.

Underwater Detection System Will Help Navy Cut Through the Clutter

A team of researchers led by ECE Professor Mahmood Azimi have developed a multipurpose sonar underwater target detection system that can mean the difference between life and death. The Colorado State team is working with the Naval Surface Warfare Center (NSWC) – Panama City Division to transition the target detection system to its computer-aided detection and classification system. The ultimate goal of the leading-edge technology, which will eventually be moved to the naval fleet, is to save lives and protect ships from damage.

Detecting and classifying underwater objects can present a sea of challenges. “The ocean bottom is an unpredictable environment, with rocks, sand formations, coral reefs, and vegetation of all shapes and sizes,” said Azimi, who has secured funding from the Office of Naval Research for a number of projects since the early 90s. “Because of these variables, it is critical to have state-of-the-art signal processing technologies that can extract pertinent features from the detailed sonar returns and classify them. This system is designed to cut through the clutter.”

With the target detection and classification system developed at Colorado State, Navy personnel will have the ability to quickly and accurately detect and identify threatening objects such as sea mines. The multiplatform system utilizes both high- and low-frequency sensors to collect data about the underwater environment, providing a more comprehensive picture of the ocean floor than the single sonar systems currently being used. The returned data will allow Navy staff to easily differentiate between manmade obstacles and naturally occurring formations.

Graduate student Derek Tucker started working on the project as a student in the ECE department’s accelerated master’s program. He recently relocated to Panama City, where he is now working full-time for the NSWC – Panama City. Tucker, who helped develop the technology, will play a vital role in transitioning the system to the test bed and eventually the naval fleet. He plans to complete his Ph.D. at CSU from Florida.
Dr. Louis Scharf, professor of electrical and computer engineering at Colorado State, has learned a lot in 38 years as an educator. He shared a bit of his wisdom with the College of Engineering’s class of 2009 at the spring commencement ceremony held in Moby Arena.

In a speech that he lightheartedly promised would last no more than six minutes, Scharf concisely and creatively touched on what it means to be a successful engineer in today’s world and the ongoing value of a solid education from a great institution.

After reviewing the elements of a good engineering education, he told the graduates, “All of you will eventually do what you were educated to do: think and puzzle and reason and design and invent. These special gifts will make you useful, rational, skeptical, and critical citizens of this great democracy, able to debate public policy to protect our ecosystems, conserve energy, revolutionize education, redesign transportation, and re-engineer health care. These are your challenges.”

Scharf maintained a personal tone throughout his talk, as he shared practical advice sprinkled with humor. He continually emphasized the importance of commitment, integrity, and being a well-balanced individual.

In addition to writing three books and countless, highly cited research publications, Scharf has taught courses that span the department’s undergraduate and graduate curriculum. Last year, CSU’s undergraduate students named him one of six professors in the College of Engineering who has made a special impact on their professional development. It is no wonder Scharf was chosen to deliver the inspirational charge.

CSU Professors Use Optics to Advance Lab-on-a-Chip Technology

Someday soon, early detection of heart disease or cancer may be as simple as putting a drop of your blood on a semiconductor chip smaller than a fingernail, according to a new paper in a scientific journal published by Dr. Kevin Lear, professor of electrical and computer engineering, his graduate students, and Dr. David Dandy, professor of chemical and biological engineering.

In an article featured on the cover of an August issue of the journal, *Lab on a Chip*, the professors reported they can detect proteins landing on a silicon chip by directing a laser or LED beam along the surface of the chip and watching where the light is deflected very slightly toward the proteins. Surface treatments that allow only specific types of proteins or other biomolecules to stick to particular areas on the chip let the researchers test what proteins are present in a fluid such as blood, urine, or saliva.

The new chip is intended to simplify and speed up medical diagnostics and other biosensor applications by eliminating extra chemicals, special equipment, and complex steps often required for current laboratory tests. The ability to sense the type of biomolecules reaching the chip qualifies it as a biosensor – a class of devices used in medical, environmental, and food safety applications.

“Our team is working to reverse the current trends of escalating prices for medical tests by applying chips that are made the same way as integrated circuits, which allow greater performance in computers at lower costs,” said Lear, who is leading the research. He noted that using silicon microelectronics technology makes it easy to include “smarts” on the chip to interpret the sensor signals and send them to a laptop or cell phone.

Their research may speed the detection of biological substances in body fluids, such as blood, that can more quickly provide information about the state of a patient’s health. The scientists say the technology will be more compact, self-contained, and self-interpreting than conventional diagnostics – important traits particularly in the developing world where basic medical care resources are scarce. They added the method could be commercialized cheaply because the chips can be manufactured with older, less expensive semiconductor technology.

The biosensor chip concept was launched in 2003 with a $2.5 million grant from the National Institutes of Health. The researchers recently obtained $50,000 in seed money from Colorado State’s Infectious Disease Supercluster – a unique model designed to speed university innovation in infectious disease to the marketplace – to improve the platform for tuberculosis detection. But the group intends to expand that research so the technology could fit a wide variety of uses, which may lead to commercialization, Lear said.

A patent is pending on the underlying technologies through the Colorado State University Research Foundation. Avago Technologies has donated processing time to create hundreds of semiconductor microprocessing chips for the research.