TB Test For Dummies

Students create a device to take the guesswork out of diagnosing tuberculosis
It’s one of the world’s most intractable medical problems, spreading at the alarming rate of one new infection every four seconds. The disease is tuberculosis, and it has now infected up to one-third of the people on Earth, primarily in the developing world, where diagnostic and treatment tools are scarce. And it’s an effective killer, claiming 1.7 million victims every year.

But those numbers may change, thanks to the pioneering work of three NC State undergraduates, who have developed the first practical diagnostic device for TB that is cheap, fast and accurate.

“Here’s the simple explanation,” says Daniel Jeck, a biomedical engineering student. “You take a patient’s saliva and put it on a slide. Then you place the slide in our device. If it glows green, then the patient has an active case of TB. Diagnosing tuberculosis is now as easy as counting glow-in-the-dark stars on the ceiling.”

It seems simple now, but it was a real challenge – and one that had stumped
professional medical device developers for years. But Jeck wasn’t alone on the project. He teamed up with two other students in the university’s rigorous Engineering Entrepreneurs Program: fellow biomedical engineering major Pavak Shah, and Hersh Tapadia, an electrical and computer engineering major.

“Our instructor told us that the most successful teams are multidisciplinary,” Shah says. “That’s true. We argued a lot, but we couldn’t have done it alone.”

What they’ve done has the potential to save thousands of lives and millions of dollars in the developing world, where up to 40 percent of all active TB cases are missed by clinics and hospitals using traditional diagnostic tools.

“In India they require three tests,” says Tapadia. “So by the time you get the test results, the disease has progressed and even spread to other people.”

Shah, whose parents were born in India, often visits relatives on the sub-continent. He says the medical infrastructure in the developing world isn’t equipped to stop the spread of tuberculosis.

“For active TB, the way most of world diagnoses it is to collect sputum, smear it on a slide that’s treated with a stain, and then look at the slide at 1,000 times magnification. That requires a trained microscopist, which is very expensive.”

It’s also slow and tedious. At 1,000 times magnification, a microscopist can scan just a small section of each slide. The NC State students estimate you could scan 45 times more area of each slide in less than one minute using their device.

And they really do mean “you.” The device can be used by anyone who can use a computer, not just a trained microscopist.

The groundbreaking device is just the latest technological marvel to emerge from NC State, where university officials launched a campuswide entrepreneurship initiative last year to expand on the success of the engineering program. NC State holds 641 active patents and has another 141 pending. It’s spun off 72 start-up companies based on technology developed by university researchers.

Programs like the Engineering Entrepreneurship Program are transforming students’ classroom experiences, confronting them with real-world problems and training them to think like the world’s most successful entrepreneurs. Shah heard about the program from a neighbor who graduated from NC State in 2007.

“He told me it’s an amazing program that would let me take my project to an amazing place,” he says.

He wasn’t kidding. The project began to take shape last fall after the students met with their project adviser, Dr. Howard Shapiro, a Boston physician who designs instruments that count and sort cells.

After he reviewed the student’s initial plans for the TB diagnostic device, Shapiro advised them to take a non-traditional approach.

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“He told us that philosophically the way we were approaching the project – the traditional approach – was wrong,” Shah says. “He said we were trying to take an expensive box built for Europe and America, take out a few pieces and send to the Third World. He said we needed to start with a new, empty box.”

Shapiro suggested that the team build off of an instrument design he had done some initial work on, showing it was possible to detect TB bacteria with very simple hardware.

That was the turning point in the project. “We decided that we had to create something so that you could push a button and read the test results,” Tapadia says. “It had to be that simple.”

They built the device using off-the-shelf components and a laptop computer. The device could be mass-produced for under $500 each, they estimate.

Since the innovation hit the front page of Raleigh’s News & Observer, the students have been overwhelmed with calls and e-mails, including an offer by Dr. Jason Stout, the North Carolina director of tuberculosis control, to conduct the first round of clinical trials for the device.

It’s unclear whether the development will make them rich; the students are still investigating several options, including working with a medical device manufacturer to make the technology available in the developing world.

“International patents are very hard to enforce,” Tapadia notes. “But if we put aside the issue of money, then perhaps we could partner with a nonprofit. And, anyway, the point isn’t making money. The point is saving lives.”
Plagiarism: Prevention, Detection, and Reporting

Concern about plagiarism is on the minds of many who are teaching courses at NC State. Plagiarism is the subject of an upcoming webinar and listserv discussion co-sponsored by the Office of Faculty Development and the Teaching, Learning, and Technology Roundtable (TLTR). This webinar consists of presentations by Dr. Henry Schaffer, Jamie Larsen, Daun Daemon, Carrie Larsen, and Paul Cousins. Many practical ideas and tools are included to assist your work with students. The webinar has already been taped and is available for viewing at any time at http://www.ncsu.edu/faculty-development/teach-learn/plagiarism.html. You can submit questions by e-mail by pressing the “envelope” button at the top of the screen. You can access links by pressing the “paper clip” button at the top of the screen. The listserv discussion runs through May 8. To join, visit http://www.ncsu.edu/tltr. For more information, contact Nancy Fire at nancy_fire@ncsu.edu.

Art to Wear Fashion Show

The 2009 Art to Wear fashion show is set for 7:30 p.m. Thursday, April 23, in Reynolds Coliseum. Merchandise and tickets will be available at the Egg (behind Brooks Hall) each Wednesday and Friday prior to the show from noon to 2 p.m. Tickets also available in Student Services in the College of Textiles from noon to 4 p.m. every Monday, Wednesday and Thursday. Reserved tickets are available for $10; general admission is free.

Burger Lecture

Landscape architect Laurie Olin, professor of landscape architecture at the University of Pennsylvania, will present the second annual Charles A. Burger Memorial Lecture at 6 p.m. Thursday, April 23, in Burns Auditorium. She will speak on the subject, “Civic Delight: Reflections on Surface, Fabric, and the Making of Civic Spaces.” There will be a reception following the lecture. The lecture is open to the public.

Spring Robotics Exhibit

The College of Education’s Spring Robotics Exhibition is scheduled for 10 a.m. to 3 p.m. Friday, April 24, in Poe Hall. Robotics education students built robots to solve a real-world problem. Student teams will be on hand to answer questions about robotics construction, engineering design and the problem-solving process. Robot demonstrations will be held throughout the day. All university faculty, staff and students are invited to attend.

For more information about the event or questions about the class TED 384, please contact Dr. Terri Varnado at terri_varnado@ncsu.edu or 515-6908.

Games Showcase

The 2009 Game Development Showcase will be held at 7:30 p.m. Friday, April 24, in Engineering Building II on Centennial Campus. The annual event, now in its fourth year, highlights the games built by teams of computer science and industrial design students in their joint courses on the game development process. Two large teams of students will give presentations describing the design and development of their games, from the initial concept phase through the definition of technical and artistic milestones to the effort involved to create a finished product.

After their presentations, students will host audience members at a reception where the games will be available for play and the students will answer questions about their work.

Food and drinks will be served at the reception. The event is free and open to the public. All game content is appropriate for children and all ages are welcome to attend. Faculty at the reception will also be able to answer questions from students and parents interested in NC State’s courses and programs focusing on game creation.

Sea Grant Requests Proposals

North Carolina Sea Grant is requesting preproposals for coastal and marine topics for its 2010-2012 core research funding cycle. The deadline for online submission is April 27.

“Preproposals must emphasize, and fall under, one of our four strategic focus areas,” notes Executive Director Michael Volland, “and must indicate direct relevance to resolving important coastal resource questions or issues.”

Sea Grant’s focus areas are:
- Hazard-Resilience in Coastal Communities
- Healthy Coastal Ecosystems
- Safe and Sustainable Seafood Supply
- Sustainable Coastal Development

Details on the focus areas, as well as specific instructions and materials for online submission, are included in application materials available at http://www.ncseagrant.org/home/research/grantsfellowships.

Hillsborough Street Meeting

Business leaders, residents, students and interested persons are invited to attend the first community meeting to provide information and answer questions about Phase I of the Hillsborough Street Project. The meeting will be held from 4 p.m. to 7:30 p.m. Tuesday, April 28, in the Hillsborough Street Partnership offices at 2100-200 Hillsborough St. (1 Maiden Lane). The meeting will have an informal floating format that will allow for interested persons to drop by anytime within the 3 1/2-hour period.

The City has a $9.92 million contract with Hamlett and Associates, Inc. for the Hillsborough Street Project Phase I, which extends from Gardner Street to Oberlin Road.

The Hillsborough Street Project is set to break ground on May 20. The project will convert Hillsborough Street to a two-lane, median-divided street with on-street parking on both sides, a seven-foot-wide raised median, sidewalk bulb-outs and several pedestrian signals. The project will replace the Hillsborough Street and Pullen Road traffic signal with a dual-lane roundabout, and replace the existing concrete and brick sidewalks. It also includes the replacement of both water and sewer utilities throughout the length of the project and the addition of LED street and pedestrian lighting.

Bunny Hop

Campus Recreation sponsors a two-mile walk/run, the Bunny Hop, at noon Thursday, April 30, at Carmichael Fitness Center. Registration and check-in begins at 11 a.m. Prizes for best costumes.

Reception for Bob Hambourger

Bob Hambourger, associate professor of philosophy, is retiring this summer after 27 years of service in the Department of Philosophy and Religion. Come recognize his accomplishments and celebrate his time at NC State at a reception at 4 p.m. Thursday, April 30, in Withers lobby.

Undergraduate Advising Awards

The Division of Undergraduate Academic Programs hosts a reception from 1 p.m. to 2:30 p.m. Thursday, April 30, to honor winners of the 2009 Undergraduate Academic Advising Awards. The reception will be held in the Tailey Student Center, Room 3118. The nominees are:

- Advising Administrator Award:
  - Karen Hauschild – First Year College
  - Karen R. Young – Psychology

- Barbara Solomon Award:
  - Megan Albidrez – Academic Support
for Student Athletes
• Elizabeth “Betsy” Alexieff – Office of Advising Support, Information & Services
• Millie Herget – First Year College
• Sandra P. Stallings – Communication Faculty Adviser Award:
  • Miriam G. Ferzli – Biological Sciences
• Candace Goode-Vick – Parks, Recreation & Tourism
• Scott Andrew “Andy” Hale – Biological and Agricultural Engineering
• Jessica Moore – Communication
• Jeffrey Reaser – English
• Roger Woodward – Statistics
New Adviser Award:
• Heather Duhart – First Year College
• Jennifer Lee – Biological Sciences
• Dara Leeder – CHASS Dean’s office
• Alison Ruff – Academic Support for Student Athletes

Arboretum Hosts Gala
The JC Raulston Arboretum will hold its annual Gala in the Garden on Sunday, May 3, from 3 p.m. to 7 p.m. The theme of this year’s event is “An Enchanted Garden Party.” In addition to a silent auction, guests will enjoy live music by the Southern String Band and gourmet hors d’oeuvres, including a special dessert reception.

Gala tickets are $60. Proceeds from the event will benefit the JC Raulston Arboretum, a working research and teaching garden of NC State University. To purchase tickets, contact Anne Porter at 919-513-3826 or anne_porter@ncsu.edu. For more information about the JC Raulston Arboretum visit http://www.ncsu.edu/jcraulstonarboretum.

Wolf Pack N Go Sale
The large exodus of resident students can yield a massive amount of unwanted materials. The purge of materials is why University Housing and NCSU Waste Reduction and Recycling are collaborating for another “Wolf Pack N Go Sale” on May 15 at the E.S. King Village Community Center. The sale starts at 8 a.m. and goes until 6 p.m. This is the fourth annual event where donated items left by students are available for parking until August (five on each of the floors).

Young Writers’ Workshop
sponsored by the NC State College of Humanities and Social Sciences and the Department of English, is a two-week, non-residential summer camp conducted in June with daily afternoon sessions to help young people develop their creative writing talents. The workshop is open to students who will enter the fourth through eighth grades in the fall. Tuition is $200 and the registration deadline is Friday, May 15. For more information, visit http://english.chass.ncsu.edu/youngwriters/youngwriters.html. A similar workshop for teens in the ninth through twelfth grades is held in July. Visit http://english.chass.ncsu.edu/youngwriters/teenwriters.html for more information.

Some Rhyme, Some Reason
Nationally recognized poets are coming to downtown Raleigh as part of a poetry reading series launched by English Department lecturers Chris Salerno and Chris Tonelli. The So and So Reading Series works in conjunction with the print journal the Raleigh Quarterly, which features work by the visiting poets, visual artists and others. Salerno and Tonelli not only run the reading series, but also serve as poetry editors for the Raleigh Quarterly.

The next reading will be held Saturday, May 16, at the Morning Times Cafe, and will feature poets Justin Marks, Kate Pringle and Chris Vitiello. More information is available at http://thesoandsoseries.blogspot.com.

Parking Reduced During Construction
As part of the Partners Way Deck Expansion project on Centennial Campus, approximately 40 spaces will be unavailable for parking until August (five on each of the floors).

On the Prowl, On the Town
The transportation department has launched a pilot weekend bus service to the Glenwood South and downtown entertainment district. This limited-stop, express service is open to the public. There is no set timetable; Wolfprowl will run a continuous loop beginning at 9 p.m. with service ending at 3 a.m., Thursday, Friday and Saturday nights.

Check real-time bus location via your Web-enabled cell phone at http://ncsu.transloc.com to determine bus arrival/ departure times.

The bus line connects to the RLine Raleigh Downtown Circulator.

Please Note: No summer or holiday service and no service on the evening prior to any university holiday.

Habib Koité in Concert
Malian guitar virtuoso Habib Koité is one of Africa’s most beloved and popular musicians. An all-time favorite of Center Stage audiences, he is returning to NC State on Saturday for his third appearance in Stewart Theatre. Backed by his sensational band Bamada, Habib’s acoustic, unadorned arrangements are stunningly beautiful and lyrical, reflecting centuries of Malian tradition, while incorporating subtle Western influences. For tickets, call 515-1100.

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Faculty and Staff Notes

Exam Permits Available
Exam permits may be purchased from the Transportation Office, Administrative Services I, 2721 Sullivan Drive, beginning the Friday prior to exams, April 24. Resident students may purchase a West Lot permit for $2 a day. Commuters may purchase a Coliseum or Dan Allen Deck permit for $2 a day as space allows. Wolfline continues normal service during exams.

Office of International Affairs Newsletter
The April 23 newsletter from the Office of International Affairs has news and information on a wide range of events taking place in the colleges. To read the newsletter, visit http://ncsu.edu/project/nsaudiovideo/pdf/CollegesNews.pdf.

Nanodays: Big Crowd for Small Science
On Friday more than 2,000 students, parents and teachers from across the state will visit NC State’s Centennial Campus for Nanodays 2009. Nanodays is designed to open the world of nanoscience and nanotechnology to children. Participants get hands-on experience in making “nano” ice cream and trying on nano sunscreen. The event is hosted by NC State’s College of Education.

Benefits for Community College Faculty
Benefits matter when it comes to job satisfaction among part-time faculty at community colleges. That’s the conclusion of a study co-authored by Dr. Paul D. Umbach, associate professor of education, who presented at the American Educational Research Association annual meeting.

Umbach and Dr. Ryan Wells of the University of Massachusetts at Amherst evaluated national survey data from 5,700 faculty at 300 community colleges. Results showed adjunct faculty members shoulder significant teaching loads at community colleges and rely on their teaching income to varying degrees.

About a third of part-timers received benefits, which were positively related to job satisfaction.

State Employees Appreciated
Gov. Perdue has proclaimed the week of May 3-9 as “State Employee Recognition Week” and May 6 as “State Employee Appreciation Day.” She urges all citizens, “to take this opportunity to join me in expressing to all state employees our appreciation for their commendable service.” Download the proclamation at http://ncsu.edu/project/nsaudiovideo/pdf/employee-recognition.pdf.

Chapman Honored
Dr. Diane Chapman of Adult and Higher Education received the 2009 Parks Todd Award for distinguished service to the field of distance learning. The North Carolina Distance Learning Association honored Chapman, an assistant professor who directs certificate and online master of education programs at NC State.

Finance and Business Presents Awards
Finance and Business presented awards for excellence to four employees: Joy Holland in the Facilities Budget Office, Jill Guzman in International Employment, Rob Yaeger in the University Architect’s office and Bob Fraser in the Centennial Campus Development office.

Chambers Joins Alumni Association
Amy Chambers was appointed Alumni Association project manager for annual giving. Her responsibilities include stewardship, Web 2.0 communications, Web site management, reports, budget and support for mail and phone programs.

Chambers previously worked as associate director of Community Counseling Services, a fundraising consulting service. Her experience includes serving as gifts and grants coordinator and stewardship director at the California Institute of Technology.

Passings
Monte McCaw
Dr. Monte Bruce McCaw, a professor of swine virology at NC State, died March 28. He was born Jan. 22, 1956 in Cedar Rapids, Iowa, and grew up on a livestock farm near Clarence, Iowa. He attended the Iowa State University College of Veterinary Medicine, where he earned his DVM degree in 1980. He was a private practice large animal veterinarian in Lake City, Iowa, for four years before obtaining a Ph.D. in swine virology at the University of Minnesota.

McCaw is survived by his wife, Teresa, of Wake Forest; sons Derek, Travis, and Tyler, all of the Raleigh area; brother, Guy, of Grinnell, Iowa; sister, Sharon McCaw Berner (Carl), of Canton, Georgia; and his parents, Gene and Ramona McCaw, of Grinnell, Iowa.

Reef Ivey
Reef Challance Ivey II, the first chair of the Board of Visitors at NC State, died March 5 after a long and heroic battle against cancer.

Ivey was born on Jan. 26, 1943, in Wadesboro and grew up in Lumberton. He was appointed to the U.S. Military Academy at West Point, but chose to attend NC State, where he graduated in 1965 with a degree in experimental statistics. From there he went on to law school at the University of North Carolina at Chapel Hill, graduating in 1968.

Ivey practiced law in New York before serving as an assistant district attorney in New York City. In 1973 he joined PepsiCo, where he served as vice-president of world trade. Ivey returned to North Carolina in 1993 to practice law. For the past seven years he was with Kieran Shanahan at the Shanahan Law Group.

In 1988 he established the Reef C. Ivey II Foundation to help underprivileged children. He chaired Citizens for NC State University during the 1993 bond referendum and served on the Executive Committee of the Economic Development Coalition 2000. He was founder and chair of the State Club, a private dining facility located in the Dorothy and Roy Park Alumni Center on Centennial Campus.

Ivey is survived by his wife, Donna, and children Reef “Tucker” III, Reef IV, Raines and Remington. His former stepdaughter, Meredith Lockhart, lives in Malvern, Penn.

Vernon Malone
State Sen. Vernon Malone, who served on NC State’s Board of Trustees for eight years, died of natural causes Saturday at his home in Raleigh. The 77-year-old Democrat represented eastern and northeastern Wake County in the General Assembly for four terms and held public office in Wake County for more than three decades.

As school board chairman, Malone presided over the merger of Raleigh city schools and Wake County public schools in 1976. In the Senate, Malone continued his work in education. He was co-chairman of the Senate’s higher education committee and appropriations committee for higher education. Malone worked as a classroom teacher and school administrator before becoming superintendent of the Governor Morehead School for the Blind in Raleigh.

Malone is survived by two sons and a daughter. His wife passed away last year.

Funeral services will be held noon Thursday at Martin Street Baptist Church, 1001 E Martin St. in Raleigh. A burial service will immediately follow at the Carolina Biblical Gardens, 1530 Crefch Road in Garner.
We conducted a short Q&A with Dr. Jeffery Braden, the new dean of the College of Humanities and Social Sciences, to learn about his plans and priorities as he takes the helm of the college.

What do the current budget problems mean for CHASS?

As is true for all colleges, reductions in state allocations mean cuts to teaching, research, and engagement. We are trying to achieve savings through voluntary departures (e.g., retirements), reallocations, or reductions in costs through increased efficiency, but we just can’t meet our mandated targets without reducing people or programs, increasing class sizes, and otherwise making sacrifices.

Tough times produce opportunities as well as challenges. What sort of opportunities are out there for CHASS?

Our biggest opportunity lies in planning for the years ahead when the economy rebounds. I am being very careful not to promise that we will restore what we cut; doing so would be using new funds to restore the way we were. Instead, we will use new funds to invest in what we want to become. As the economy rebounds, CHASS will truly will have the opportunity to invent itself – and that’s an exciting challenge.

Why are humanities and social sciences important in the 21st Century?

The problems of the 21st century cannot be solved without understanding and changing the way people think and the way people act. The way people think about and understand the world and their place within it is the focus of the humanities; likewise, the way people interact within their social and physical contexts is the focus of the social sciences. Therefore, the humanities and social sciences have never been more important to solving problems, whether they be economic, social, environmental, military, or international. CHASS is not just relevant, CHASS is essential for solving the problems of the 21st century.

What do you hope to accomplish as dean of CHASS, both short-term and long-term?

In the short term, we will have two very different tasks: responding to limited and perhaps declining resources, and planning for the future. My goal is to manage the fiscal challenges by actively consulting and communicating with our stakeholders so everybody has the opportunity to be heard, and to understand what we’ll be doing and why we’ll be doing it. Meanwhile, I want to look beyond our immediate challenges to develop long-term goals. That way, as we begin to recover resources, we can invest them wisely to sustain and build nationally and internationally recognized academic, research, and engagement activities consistent with system, university, and college goals.