Science News

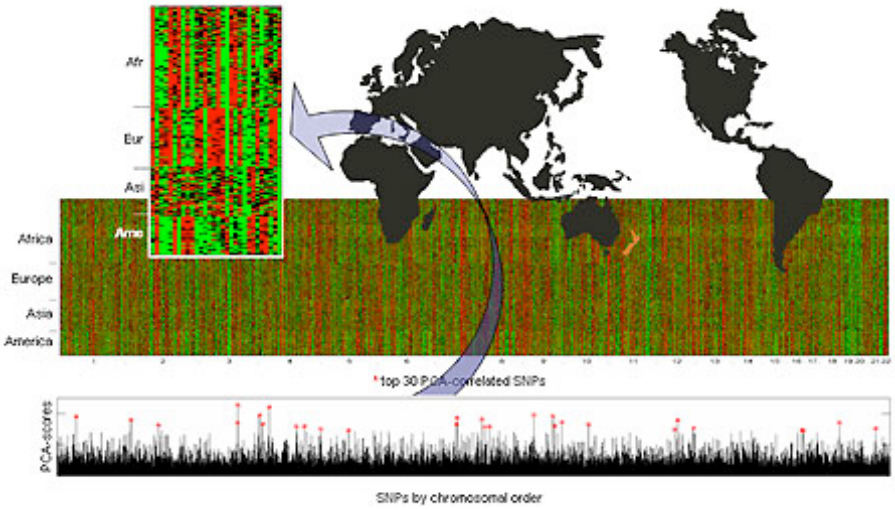
October 2007

Monthly Newsletter of Rensselaer's School of Science

Volume 1, Number 8

Featured Story

Computer Program Traces Ancestry Using Anonymous DNA Samples



Plot of genetic markers for 255 individuals from four continental regions. Red and green represents identical genotypes. Black represents genotypic variations. Notice the distinct patterns formed in the four continental blocks. Image Credit: Democritus University of Thrace/Peristera Paschou

A group of computer scientists, mathematicians, and biologists from around the world have developed a computer algorithm that can help trace the genetic ancestry of thousands of individuals in minutes, without any prior knowledge of their background. Unlike previous computer programs of its kind that require prior knowledge of an individual's ancestry and background, this new algorithm looks for specific DNA markers known as single nucleotide polymorphisms, or SNPs (pronounced snips), and needs nothing more than a DNA sample in the form of a simple cheek swab. The researchers used genetic data from previous studies to perform and confirm their research.

"Now that we have found that the program works well, we hope to implement it on a much larger scale, using hundreds of thousands of SNPs and thousands of individuals," said Petros Drineas, the senior author of the study and assistant professor of computer science at Rensselaer Polytechnic Institute. "The program will be a valuable tool for understanding our genetic ancestry and targeting drugs and other medical treatments because it might be possible that these can affect people of different ancestry in very different ways." Read more.

Honors and Awards

- Boleslaw Szymanski (Professor, Computer Science; Director, Center for Pervasive Computing and Networking) received the Distinguished Service Award from the International Technology Alliance on September 26th, 2007, one of the two awarded this year.

Research Accomplishments

- Jim Hendler (Constellation Professor, Tetherless World Constellation; Professor, Computer Science) co-chaired the Scientific Advisory Board meeting for the Web Science Research Initiative. Held in London, Sept 18-20, the meeting included a dinner at the House of Lords hosted by Baroness Rennie Fritchie of Gloucester, talks by Lord Robert May of Oxford and Sir Timothy Berners-Lee, inventor of the World Wide Web, and two days of discussion about the future of the World Wide Web. Hendler led a session on "reinventing academic publishing" at that meeting.

- Chang Ryu (Associate Professor, Chemistry and Chemical Biology) is the lead PI on the first ever NSF PIRE (Partnership for International Research and Education) program grant between the US and Korea. The project is a collaborative effort between scientists and engineers at the Rensselaer Polytechnic Institute, University of Massachusetts at Amherst, University of Texas at Austin, North Carolina State University, Pohang University of Science and Technology, Seoul National University, Sogang University, and Yonsei University. A specialist from the State University of New York at Albany oversees the Korean language and cultural training. This team is working together to develop a global research and education endeavor in polymer synthesis, characterization, and theory of heteropolymers with adjustable monomer sequences (HAMS). The award is $500,000.
- Boleslaw Szymanski (Professor, Computer Science; Director, Center for Pervasive Computing and Networking) delivered a Keynote Speech at the 7th PPAM Conference in Gdansk, Poland on September 10th, 2007. The title of the talk was "Malleability, Migration and Replication for Adaptive Distributed Computing over Dynamic Environments".
- Boleslaw Szymanski (Professor, Computer Science; Director, Center for Pervasive Computing and Networking) recently co-chaired the 7th International Conference on Parallel Processing and Applied Mathematics (PPPAM'07) in Gdansk, Poland. This is one of the premier conference on high performance computing in Europe. He also recently co-chaired the First Annual Conference of the International Technology Alliance in Washington DC.
- Gwo-Ching Wang (Professor and Head, Physics, Applied Physics and Astronomy) received another year of funding from the National Science Foundation for the IGERT program titled "Terahertz Science and Technology-A Studio-Based Approach". The amount of the funding is about $750K.
- Bruce Watson (Institute Professor and Acting Head, Earth and Environmental Science), Jay Thomas (Postdoctoral Researcher, Earth and Environmental Science), and Daniele Cherniak (Research Professor, Earth and Environmental Science) published a paper in the September 20 issue of the journal *Nature* that challenges commonly held ideas about how gases are expelled from the Earth. Their theory could change the way scientists view the formation of Earth's atmosphere and those of our distant neighbors, Mars and Venus. Their data throw into doubt the timing and mechanism of atmospheric formation on terrestrial plants. For details, see http://news.rpi.edu:80/update.do?artcenterkey=2311.
- Doug Whittet (Professor, Physics, Applied Physics, and Astronomy) received a new three-year award from the NASA Exobiology program. The title of the award is "Evolution of Preplanetary Matter in Analogs of the Early Solar System", and the total funds in the award are $348,168.

Other News

- Gary Bedrosian (Visiting Scientist, Physics, Applied Physics and Astronomy), Don Millard (Director, Academy of Electronic Media), Scott Dwyer (Laboratory Supervisor, Physics, Applied Physics and Astronomy), and Gwo-Ching Wang (Professor and Head, Physics, Applied Physics and Astronomy) received a new grant of $150K for 2 years from the National Science Foundation, titled "Hands-On Physics Outside the Classroom".
- Albert Redo Sanchez (Research Assistant Professor, Center for Terahertz Research) was interviewed by News Channel 13 about research being done in the Terahertz group with NASA and Lockheed Martin. It can be viewed at: http://wnyt.com/article/stories/S167230.shtml?cat=300.
- Wei Zhao (Dean, School of Science) organized and hosted a National Science Foundation Symposium on "Cyber-Enabled Discovery and Innovation". The symposium was part of the CCNI grand-opening celebration. The event featured technical presentations by scientists and engineers addressing the complexity of the interactions of cyber and physical worlds. Arden L. Bement Jr., director of the National Science Foundation (NSF), delivered the capstone address at dinner on Sept. 6. For more information on the event, see http://www.rpi.edu/about/inside/issue/v1n4/symposium.html.
- The goal of the School of Science is to have 100% participation by undergraduates in research during the academic year and/or the summer. To this end, three endowed research scholarships have been established to allow students to undertake research during the summer. They are the:

- **Miriam and Milton Prince ’34 Fellowship** - Milton A. Prince earned his bachelors in electrical engineering in 1934. He purchased a private company, the Republic Electronics Corporation, and served as the company owner, president and chairman of the board for forty-four years. The company specialized in ceramic electronic capacitors and ceramic research and development. Mr. Prince died in 1995. The Miriam and Milton Prince ’34 Undergraduate Research Scholars Fund for the School of Science was established in 1997.
- **Jack Marsh ’58 Fellowship** - John L. Marsh, Jr. received three degrees from Rensselaer, a B.S. in electrical engineering, and an M.S. and Ph.D. in Physics. Dr. Marsh was the co-founder and president of Quantum Solutions, a manufacturer of electronics for the oil and gas industry. He is retired. The John L. Marsh ’58 Undergraduate Research Scholars Fund for the School of Science was established in 1992.
- **Carol D. and Samuel C. Wait, Jr. ’53 Fellowship** - Samuel C. Wait, Jr. received three degrees from Rensselaer, a B.S., M.S. and Ph.D. in Chemistry. He joined the Rensselaer faculty in 1961 and became Associate Dean of the School of Science in 1972, a position he continues to hold. The Carol D. and Samuel C. Wait, Jr. ’53 Undergraduate Research Scholars fund was established in 2005.

Upcoming Events

- President’s Fall Town Meeting, October 9, DCC 308 (All faculty, staff, and students are encouraged to attend)
- Discovery Day Open House, October 13 (All departments should plan to participate)
- Homecoming and Family Weekend, October 19-21
- Honors Convocation, October 20, 10:00 AM, Armory
- Computer Science Day, October 26, 9:20 AM, Biotech Auditorium (for program details, see http://www.cs.rpi.edu/news/rpicsday/csday2007.pdf)

This newsletter is prepared monthly and distributed to faculty, staff and students in the School of Science to keep everyone informed of accomplishments and events within the school. Corrections and items for the next newsletter should be sent to spoond@rpi.edu.