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Career Watch: Working in Biometrics

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Career Watch: Working in Biometrics

By Kathryn Hulick

Do you spend long amounts of time staring at the whorls on your fingertips or studying the shape of your hands? Have you ever been captivated by a pair of uniquely colored eyes? Are you a computer whiz who also enjoys math? If you answered "yes" to any of these questions, you may have a future career in biometrics! Biometrics is the use of unique physical characteristics, such as fingerprints, hand geometry, or the irises of eyes, as identification. Read on to meet a professor, a research scientist, and a graduate student who work in this field. They'll tell you about what they do every day, and what's so cool about the science of identity.

Arun Ross

Assistant Professor of Computer Science and Electrical Engineering at West Virginia University

Have you ever tried using a fingerprint or an iris scanner? Professor Arun Ross loves to show high school visitors to his campus how these machines work, and watch their reactions. "Kids like to interact with these devices because they are excited to see machines guessing their identity."

Biometrics is also popular entertainment. "Now that you have programs like *CSI* on television," says Ross, "people are becoming more aware of forensics and biometrics." Ross himself used to try matching fingerprints visually, like a detective in an old movie. Now he works on computer *algorithms* to make fingerprint matching faster, more convenient, and more accurate.

"I chose academia because I love teaching and working with motivated students," says Ross. In his Pattern Recognition class, graduate students learn how to develop techniques to write and manipulate computer programs to identify different types of patterns. Biometric Systems is an undergraduate course that explores how different human traits and behaviors are used to represent identity. The homework for these courses involves lots of math and programming, but students also research real-world applications of this technology.

Are you interested in studying biometrics? "There are plenty of new things to discover in this rapidly evolving field," says Ross. "To develop technology that will eventually monitor our national borders, protect our laptops, and start our cars is definitely cool and fascinating."

Salil Prabhakar

Chief Scientist at Digital Persona, Inc.

Every day, employees at Digital Persona, Inc. use their fingertips to log onto the company's online server. There's also one lab with a special access unit, but not because the room holds any top

secrets. "We use it just for fun," says Salil Prabhakar, Chief Scientist at this company that specializes in fingerprint-based biometric solutions.

If fingerprint scanners sound like something out of a spy movie, think again. This technology is coming soon, to a school near you! Schools in England, Scotland, and the United States have already installed fingerprint readers in libraries, on lockers, and in the cafeteria. "Kids don't have to remember to take library cards or lunch cards," says Prabhakar.

Digital Persona also supplies biometric solutions for banks, factories, cell phones, and many other applications. The Microsoft Fingerprint Reader, developed by Digital Persona, allows you to replace all your online passwords and protect your account information with a code based on the patterns of your fingerprint.

Another device, called the plusID and developed by Privaris, a biometrics security company based in Virginia, looks like a flash drive you could clip on your key chain but "it does everything," says Prabhakar. "That's the coolest product I've seen." The device is only 2.6 inches long, but with a press of your finger, it could allow you to open your garage, log onto online networks, or unlock the door to a restricted access room. If anyone else picks up the device, it doesn't work.

When asked about the future of biometrics, Prabhakar says, "these devices will be deployed in applications that will touch everyone's life." Lost keys and forgotten passwords may become a thing of the past. It's pretty difficult to forget your own finger.

Kelly Smith
Graduate Student in Electrical Engineering at West Virginia University

When grade school visitors come to campus, Kelly Smith introduces them to biometrics. "There are three ways to authenticate somebody," she says. "You can use what they know, like a password, what they have, like a token or an ID card, or you can use what they are, which is a biometric."

In the collection lab, Smith and her fellow students and professors collect data from volunteers to test various biometric devices. They have fingerprint readers, a 3-D face-capture device, microphones for voice capture, an iris acquisition device, and a hand geometry reader. Your *hand geometry* is all the lengths, widths, and thicknesses of your hand and fingers. "Most people's right and left hands are symmetric," says Smith. The system uses the image of the right hand, but because of the symmetry, "most people can flip over their left hand, present it to the system, and still be recognized," Smith explains.

A biometrics systems developer must understand the whole process of authentication. A system might use **optics** concepts from electrical engineering to capture an image of a fingerprint or iris. Then computer-engineering concepts will be applied to transfer that information to a computer and store an **encrypted** version in a database. The algorithms used to identify similarities and differences in the image come from the field of computer science.

But what does Smith do on an average day? "I go to class!" she laughs. Her favorite class? Advanced Biometrics, where she applies algorithms to match characteristics such as faces, hands, and fingerprints.

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Algorithms--Logical, step-by-step procedures for solving problems mathematically

Optics--The study of light and vision

Encrypted--Put into a code

Kathryn Hulick wishes she could have used an iris scanner to get through all the airports and borders on her way to and from Kyrgyzstan, where she served in the Peace Corps for two years. This is her first article for ODYSSEY.