

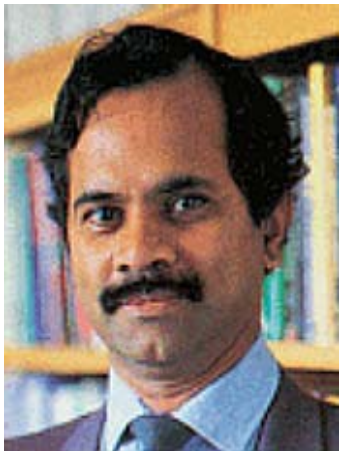
**THURSDAY
NOVEMBER 9, 2006**

**Scaife Hall Auditorium
Room 125**

**4:30 p.m.
Refreshments—4:00 p.m.**

RAMA CHELLAPPA

**MINTA MARTIN PROFESSOR OF ENGINEERING,
ECE DEPT, UNIVERSITY OF MARYLAND**



Prof. Chellappa received the M.S.E.E. and Ph.D. Degrees in Electrical Engineering from Purdue University, West Lafayette, IN, in 1978 and 1981 respectively. Since 1991, he has been a Professor of Electrical and Computer Engineering and an Affiliate Professor of Computer Science at University of Maryland, College Park. He is also affiliated with the Center for Automation Research (Director) and the Institute for Advanced Computer Studies (Permanent member). Recently, he was named a Minta Martin Professor of Engineering. Over the past 25 years, he has published numerous book chapters, peer-reviewed journal and conference papers. He has co-authored and edited many books in visual surveillance, biometrics, MRFs and image processing. His current research interests are in face and gait analysis, 3D modeling from video, surveillance and monitoring, hyper spectral processing, and computer vision. Prof. Chellappa served as the associate editor of many IEEE Transactions and as the Editor-in-Chief of IEEE Transactions on Pattern Analysis and Machine Intelligence. He served as a member of the IEEE Signal Processing Society's Board of Governors and as its Vice President of Awards and Membership. He has received several awards, including an NSF Presidential Young Investigator Award, two IBM Faculty Development Awards, an Excellence in Teaching Award and a Technical Achievement Award from IEEE Signal Processing Society. He was elected as a Distinguished Faculty Research Fellow and as a Distinguished Scholar-Teacher. He is a Fellow of IEEE and the International Association for Pattern Recognition. He has served as a General the Technical Program Chair for several IEEE international and national conferences and workshops. He is a Golden Core Member of IEEE Computer Society.

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Pattern Recognition in Video

With the ubiquitous presence of inexpensive video cameras, new challenges to video-based pattern recognition problems are emerging. Video-based pattern recognition problems have applications in homeland security, healthcare, battlefield awareness, and video indexing and anomaly detection. The single most important feature that distinguishes video-based pattern recognition problems from still-image based recognition problems is the dynamical nature of patterns in videos. This creates new intellectual challenges and provides opportunities for novel approaches.

In this talk, I will first discuss some of the general principles for designing robust video-based pattern recognition systems. Classifiers must be designed based on the principles of invariance to illumination, pose, articulation and sensor parameters. They also must be able to account for the dynamics of patterns. To accomplish this, we use a combination of tools from statistical pattern recognition, computer vision, geometry and control theory. Characterization of class-conditional densities using pattern's appearance, shape, and motion and scene illumination conditions are discussed. Statistical classifiers for a multitude of video-based recognition problems such as human identification/verification using face and gait features, vehicle identification across non-overlapping cameras and human activity recognition are presented with examples. A method for compensating for the variations in the rate at which patterns evolve and the role of quasi-invariants in activity recognition are then discussed. A non-parametric methods based on our novel "human gait DNA" signature is then described for recognizing human motion patterns. The problem of anomaly detection in video is posed and solved as a one class recognition problem. Finally, we discuss many theoretical issues and practical problems that remain to be addressed in this area.