The Golden Age of Imaging

WE LIVE IN the golden age of imaging. Imaging research, development, and applications are growing at an astounding rate, and image-processing researchers can take credit for having created much of the enabling technologies that have fueled this growth. We are all familiar with the examples. The development of image and video coding standards, such as JPEG and MPEG, has enabled the web as a center for commerce and entertainment. Ubiquitous technologies, such as Direct TV, DVDs, BlueRay, and TiVo, depend on these standards; streaming internet video services, like iTunes' recently announced movie rental feature, are well on their way to replacing traditional analog broadcast video. Other consumer products, such as home printers, digital cameras, and mobile video devices, have each been a major disruptive product enabled by fundamental innovation from image-processing researchers.

In fact, image-processing research has not just impacted consumer products; it has changed the nature of scientific investigation and human healthcare. From the Mars Rover's transmission of compressed digital video to the reconstruction of virus structure using cryo-electron microscopy, advanced digital imaging algorithms are at the heart of essential scientific investigation. In the field of healthcare, diagnostic imaging has revolutionized patient care. Any radiologist will tell you that volumetric CT and parallel acquisition MRI have changed medical imaging in the last decade by allowing dramatically faster and more accurate patient scans. These technologies have virtually eliminated the exploratory surgeries that were so common just a generation ago, and they promise to replace existing, invasive medical procedures, such as cardiac angiography. However, what your cardiologist may not know is that these technologies depended critically on the development of a variety of new volumetric image reconstruction algorithms that were developed by researchers in the imaging community.

Image-processing research is clearly undergoing rapid growth. This growth is being fueled by a need for innovation in both established technologies and emerging applications. For example, Microsoft's new HD compression format promises to have a great impact on the established world of digital photography and electronic imaging, and low-bit-rate video is becoming ever more important with the growth of mobile devices. At the same time, emerging research areas related to security, such as watermarking, surveillance, image forensics, and biometrics, are of rapidly growing importance. Moreover, entirely new fields are only starting to be realized. Research in image-based rendering and plenoptics is changing the way people think about conventional graphics and opens the possibility of imaging databases that could change our daily lives. If you doubt this possibility, you are welcome to drive past my home using Google's Street View.

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Imaging researchers are uniquely equipped to solve this wide variety of problems because they understand the fundamental principals of applied math, algorithms, physical sensing, and human perception that lie at the core of these applications. As engineers, image-processing researchers also have the skills necessary to creatively assemble these pieces into solutions that address critical human needs. Clearly, imaging research has matured into a well-defined discipline with a core foundation of knowledge that cuts across application boundaries. It is a great field for students who enjoy both the difficult technical challenges and the opportunity to work collaboratively with multidisciplinary teams. The technical problems may be challenging, but experts in imaging have great opportunities, and their unique expertise can make them virtually irreplaceable in many organizations.

The IEEE TRANSACTIONS ON IMAGE PROCESSING is here to support your needs as a researcher in the imaging field. Whether you are a reader, an author, or a member of the editorial board, this is your journal, and we depend on your participation to make it the best it can be. In fact, the field of image processing is doing well, and so is the IEEE TRANSACTIONS ON IMAGE PROCESSING. This past year, our impact factor went up sharply to 2.72, which tells me that we are publishing the articles that you want to see. Our submission rate has also been steadily growing, and I believe we have the most extensive and intellectually diverse editorial board ever. There are also new features to help readers find the articles of greatest interest. For example, the new IEEE TRANSACTIONS ON IMAGE PROCESSING web page now allows readers to quickly find the most frequently downloaded articles. It also links the reader to the IEEE's table-of-contents alerts, which e-mails readers the journal's table-of-contents with each new issue.

As you look at this month's issue of the IEEE TRANSACTIONS ON IMAGE PROCESSING, you may notice that the papers are organized around new topics that we hope better represent the growing breadth of the field. This is the first major reorganization in the structure of the Editors Information Classification Scheme (EDICS) in several years, and we hope that it will encourage the submission of even more innovative research in a broader array of applications. However, along with success comes challenges. The IEEE TRANSACTIONS ON IMAGE PROCESSING is your journal, and we depend on the engagement of the imaging research community to make it successful. If you have ideas for improvement, pass them on. Consider the IEEE TRANSACTIONS ON IMAGE PROCESSING as a venue for your best-quality research. When possible, help with the review of the IEEE TRANSACTIONS ON IMAGE PROCESSING papers so we can uphold the highest standards of quality and give the best possible feedback to authors.

We are certainly lucky to be researchers in such an exciting field, but keeping up with all the innovation can be difficult. We think that the IEEE TRANSACTIONS ON IMAGE PROCESSING can help you meet this challenge by being your central source for high-quality, up-to-date archival information and by providing you with a high-impact venue for publishing your best work.

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Dr. Bouman is a Fellow of the American Institute for Medical and Biological Engineering (AIMBE), a Fellow of the society for Imaging Science and Technology (IS&T), a Fellow of the SPIE professional society, a recipient of IS&T's Raymond C. Bowman Award for outstanding contributions to digital imaging education and research, and a University Faculty Scholar of Purdue University. He is currently the Editor-in-Chief of the IEEE TRANSACTIONS ON IMAGE PROCESSING and a member of the Steering Committee for the IEEE TRANSACTIONS ON MEDICAL IMAGING. He has been an Associate Editor for the IEEE TRANSACTIONS ON IMAGE PROCESSING and the IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE. He was also Co-Chair of the 2006 SPIE/IS&T Symposium on Electronic Imaging, Co-Chair of the SPIE/IS&T conferences on Visual Communications and Image Processing 2000 (VCIP), a Vice President of Publications, and a member of the Board of Directors for the IS&T Society, and he is the Founder and Co-Chair of the SPIE/IS&T Conference on Computational Imaging.