Preface

Shape has a long and rich history in vision research. On the computer vision side, shape was the backbone of classical object recognition systems in the 1960s, 1970s, and 1980s. However, the advent of appearance-based recognition in the 1990s drew the spotlight away from shape. While an active shape community continued in the periphery, only recently has shape re-entered the mainstream with a return to contours, shape hierarchies, shape grammars, shape priors, and even 3-D shape inference. On the human vision side, shape research was also affected by paradigm changes. Unlike the computer vision community, psychologists have usually agreed that shape is important, but it has been less clear to them what it is about shape that should be studied: surfaces, invariants, parts, multiple views, learning, simplicity, shape constancy or shape illusions? The growing interest in mathematical formalisms and computational models has begun to provide the long overdue common denominator for these various paradigms.

In an effort to foster greater dialog between these two communities of shape researchers, we co-organized a very successful series of four International Workshops on Shape Perception in Human and Computer Vision, in conjunction with ECCV 2008 (http://viper.psych.purdue.edu/workshops/iwsphcv08/), ECVP 2009 (http://viper.psych.purdue.edu/workshops/iwsphcv09/), ECCV 2010 (http://viper.psych.purdue.edu/workshops/iwsphcv2010/), and VSS 2011 (http://www.visionsciences.org/satellite_shape_perception.htm), two computer vision venues and two human vision venues. The format of each workshop was identical: 12 distinguished invited speakers, 6 from human vision and 6 from computer vision. Each speaker was invited not to present their latest and greatest research, but to reflect more broadly on the issues and challenges they've faced over their careers and the major challenges ahead. Moreover, the speakers were chosen to cover the topic from all sides rather than promote a particular paradigm. The workshops were a great success and received funding from a number of sources.

The goal had always been to have the union of the four workshops' authors each submit a chapter to an interdisciplinary collection modeled after the workshops. What follows is a collection that is the realization of that goal, offering 33 chapters by a set of world-class shape researchers from both sides of the aisle. Most of the

authors have worked on the problem of shape perception for many years (decades), and have a unique perspective to offer researchers and students alike on what issues have shaped the field, the trends we've followed, the progress we've made, and the challenges we face. Just like the four workshops, this collection offers a unique, interdisciplinary perspective that is essential for young researchers to understand the broader landscape of the problem so that they can build on a firm foundation. We hope you find the collection as exciting and as useful as we do.

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Shape Perception in Human and Computer Vision
An Interdisciplinary Perspective
Dickinson, S.; Pizlo, Z. (Eds.)
2013, XVII, 502 p., Hardcover