

Todd Alan Harvey

Ecology and Evolutionary Biology, 166 ESC
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EDUCATION

Yale University

Research: Computer modeling of avian courtship displays, plumage morphology and visual signaling;
Avian color vision, organismal color phenotypes and 3D imaging spectroscopy.

Advisor: Richard O. Prum

2012– Postgraduate Associate in Ecology and Evolutionary Biology
2010–2012 Visiting Assistant in Research in Ecology and Evolutionary Biology

Cornell University, PhD, 2012

Thesis: Spatially- and Directionally-varying Reflectance of Milli-scale Feather Morphology

Committee: Susan Suarez Zoology
Steve Marschner Computer Science
Ellis Loew Physiology
Kimberly S. Bostwick Ecology and Evolutionary Biology
John Hermanson Zoology

2011–2012 PhD candidate in Zoology and Wildlife Management
2006–2010 MS student in Computer Graphics

Brigham Young University, BA, 1996

1992–1996 Design
1987–1989 Applied Physics, Computer Science

EXPERIENCE IN RESEARCH AND DEVELOPMENT

Yale University, New Haven, CT

2010– Visiting Assistant in Research, and later, Postgraduate Associate,
Richard Prum Lab, Department of Ecology and Evolutionary Biology

Cornell University, Ithaca, NY

2009 Graduate Research Assistantship, Steven Marschner Lab, Department of Computer Science
2008 Summer Graduate Research Assistantship, Donald Greenberg Lab, Program of Computer Graphics
2007 Summer Graduate Research Assistantship, Donald Greenberg Lab, Program of Computer Graphics
Thesis research

Weta Digital, Wellington, NZ

2004–2005 Lead Technical Director, *King Kong*
Development of King Kong's fur appearance under the direction of Joe Letteri

2002–2003 Lead Sequence Lighting Technical Director
Development of relighting pipeline with Pixar IRMA

Centropolis Effects, Culver City, CA

2002 R&D Technical Director, *Willard*
Development of rat fur groom and appearance
Development of lighting and render pipeline

2000–2001 R&D Technical Director, *Eight Legged Freaks*
Development of spider hair groom and appearance
Development of lighting and rendering pipeline

Perkin-Elmer (later Hughes Danbury Optical Systems), Danbury CT

- 1993–1994 Strategy and Analysis internship, NASA Chandra X-ray Observatory optical fabrication lab
Devised optical polishing strategies to achieve surface figure by predictive simulation
- 1992 Summer Internship, Cynthia Vernold Lab
- 1989–1990 Internship, Cynthia Vernold Lab
- 1988 December Internship, Cynthia Vernold Lab
Developed software component of multiple-wavelength scatterometer
- 1988 Summer Internship, Mark Steier Lab
Developed software component of cryogenic test bed for flexure stress testing aluminum

TEACHING ASSISTANTSHIPS

- 2008 Fall *Disruptive Technology*, Prof. Donald Greenberg, Cornell University
Johnson Graduate School of Management
- 2008 Spring *Advanced Computer Animation*, Prof. Donald Greenberg, Cornell University
Cross-listed in Art, Architecture and Computer Science
- 2007 Fall *Computer Animation*, Prof. Donald Greenberg, Cornell University
Cross-listed in Art, Architecture and Computer Science
- 2007 Spring *Disruptive Technology*, Prof. Donald Greenberg, Cornell University
Johnson Graduate School of Management
- 2006 Fall *Visual Imaging in the Electronic Age*, Prof. Donald Greenberg, Cornell University
Cross-listed in Art, Architecture and Computer Science

EXPERIENCE IN ANIMATION SHOT PRODUCTION

- 2006 Jun – 2006 Aug / Rising Sun Pictures, Adelaide AU
Project: *Charlotte's Web*
Position: Lead Lighting Technical Director
Responsibility: Lit and rendered Charlotte shots + Lighting team leader
- 2006 Mar – 2006 Jun / Rhythm & Hues Studios, Los Angeles CA
Project: *Superman Returns*
Position: Lighting Technical Director
Responsibility: Lit and rendered Fortress of Solitude shots
- 2004 Nov – 2005 Nov / Weta Digital, Wellington NZ
Project: *King Kong*
Position: Lead Technical Director
Responsibility: Lit and rendered King Kong in NYC shots
- 2004 Feb – 2004 Jun / Sony Pictures Imageworks, Culver City CA
Project: *Spiderman 2*
Position: Lighting and Compositing Technical Director
Responsibility: Lit, rendered and composited Doc Ock shots
- 2003 Nov – 2004 Feb / Dreamworks Feature Animation, Glendale CA
Project: *Madagascar*
Position: Lighting Artist
Responsibility: Lit and rendered Marty's birthday shots in the Central Park Zoo

2002 Jul – 2003 Oct / Weta Digital, Wellington NZ

2nd Project: *Lord of the Rings: Return of the King*
Position: Lead Sequence Lighting Technical Director
Responsibility: Gollum shots
1st Project: *Lord of the Rings: The Two Towers*
Position: Lighting Technical Director
Responsibility: Gollum shots

1999 Jun – 2002 Jul / Centropolis Effects, Culver City CA

3rd Project: *Eight Legged Freaks*
Position: R&D Technical Director
Responsibility: Lit and rendered spider shots
2nd Project: *The Patriot*
Position: 3D Animator
Responsibility: Choreographed and lit battlefield shots
1st Project: *Stuart Little*
Position: Sequence Supervisor
Responsibility: Textured, lit and rendered talking cats head replacement shots

1996 Oct – 1999 Feb / Rhythm & Hues Studios, Los Angeles CA

5th Project: *Babe 2: Pig in the City*
Position: Technical Director
Responsibility: Textured, lit, rendered and composited talking animal head replacement shots
4th Project: *Goldies* (California cheese commercial)
Position: Technical Director
Responsibility: Lit and rendered goldfish and composited on live action backgrounds
3rd Project: *Eggs of Steel* (Playstation video game)
Position: Technical Director
Responsibility: Lit, rendered and composited steel mill cut scenes
2nd Project: *Race for Atlantis* (Stereoscopic OMNIMAX theme park ride)
Position: Technical Director
Responsibility: Textured, lit, rendered, and composited in stereoscope
1st Project: *Colgate* (commercial)
Position: Technical Director
Responsibility: Textured, lit and rendered foil toothpaste box

RELEVANT SKILLS

Morphology/Phenotype

Measurement and analysis of spectral reflectance, directional reflectance and color
Digital imaging
Laser scanning
Computed Tomography
Photogrammetry

Programming/Pipeline

Shell
MATLAB
Java
Python
Maya Embedded Language (MEL)

Visual Design

3D animation (Maya)
3D rendering (Pixar Renderman)
2D compositing (Shake)
Vector graphics (Illustrator)
Pixel graphics (Photoshop)

REFEREED PUBLICATIONS

“Visualization of color as birds see it.” Jan Beneš, [Todd Alan Harvey](#), Edgar Velázquez-Armendáriz, and Richard O. Prum. *Proceedings of ACM SIGGRAPH Asia 2013 Posters* 21, 2013. ([doi:10.1145/2542302.2542328](https://doi.org/10.1145/2542302.2542328))

“Directional Reflectance and Milli-scale Feather Morphology of the African Emerald Cuckoo, *Chrysococcyx cupreus*.” [Todd Alan Harvey](#), Kimberly S. Bostwick, and Steve Marschner. *Journal of the Royal Society Interface* 10:20130391. ([doi:10.1098/rsif.2013.0391](https://doi.org/10.1098/rsif.2013.0391))

“Measuring Spatially- and Directionally-varying Light Scattering from Biological Material.” [Todd Alan Harvey](#), Kimberly S. Bostwick, and Steve Marschner. *Journal of Visualized Experiments* 75:e50254, 2013. ([doi:10.3791/50254](https://doi.org/10.3791/50254))

“3D Imaging Spectroscopy for Measuring Hyperspectral Patterns on Solid Objects.” Min H. Kim, [Todd Alan Harvey](#), David S. Kittle, Holly Rushmeier, Julie Dorsey, Richard O. Prum, and David J. Brady. *ACM Transactions on Graphics* 31:4, July 2012, pp. 38:1–11. ([doi:10.1145/2185520.2185534](https://doi.org/10.1145/2185520.2185534))

PUBLISHED DATA

“Data from: Directional reflectance and milli-scale feather morphology of the African Emerald Cuckoo, *Chrysococcyx cupreus*.” [Todd Alan Harvey](#), Kimberly S. Bostwick, and Steve Marschner. *Dryad Digital Repository*, July 2013. ([doi:10.5061/dryad.332b5](https://doi.org/10.5061/dryad.332b5))

INVITED PRESENTATIONS

“From microscopic feather structure to whole-organism display behavior: using multiple specimen types to uncover the private courtship signals of *Parotia wahnesi* (Paradisidae).” [Todd Alan Harvey](#), Edwin Scholes, Kimberly S. Bostwick, Tim G. Laman, and Steve Marschner. *The Extended Specimen: Emerging Frontiers in Collections-based Ornithological Research*, American Ornithologists' Union, Aug 2013.

“From Micro to Whole Animal: New Insights into Plumage Appearance from a Bird's Perspective.” [Todd Alan Harvey](#). Biology Colloquium, University of Akron, Feb 14, 2013.

“From Organismal- to Millimeter-scale: Methodologies for Studying Patterns in Color and Direction of the Reflectance from Avian Organisms.” [Todd Alan Harvey](#) and Kimberly S. Bostwick. *Emerging Technology and Innovation in Natural History Collections Management*, The Society for the Preservation of Natural History Collections, June 2012.

PRESENTATIONS

“Visualization of avian phenotypes: patterns of color and direction.” [Todd Alan Harvey](#), Jan Beneš, Edgar Velázquez-Armendáriz and Richard O. Prum. *The Northeast Regional Meeting of the Society for Integrative and Comparative Biology*, Oct 2013.

“Hyperspectral and Directional Reflectance from Plumage.” [Todd Alan Harvey](#). Photon Engineering, Jan 14, 2013.

“3D Imaging Spectroscopy for Measuring Organismal Hyperspectral Patterns.” [Todd Alan Harvey](#) and Richard O. Prum. *Society for Integrative and Comparative Biology*, Jan 2013.

“Spatially- and Directionally-varying Reflectance of Milli-scale Feather Morphology.” Todd Alan Harvey, Kimberly S. Bostwick, and Steve Marschner. *Society for Integrative and Comparative Biology*, Jan 2013. (Poster Presentation).

“3D Imaging Spectroscopy for Measuring Hyperspectral Patterns over the Surface of an Organism.” Todd Alan Harvey and Richard O. Prum. *The Northeast Regional Meeting of the Society for Integrative and Comparative Biology*, Nov 2012.

“Spatially- and Directionally-varying Reflectance of Milli-scale Feather Morphology.” Todd Alan Harvey. Ecology and Evolutionary Biology Department Seminar, Yale University, Oct 19, 2012.

“3D Imaging Spectroscopy for Measuring Hyperspectral Patterns on Solid Objects.” Min H. Kim, Todd Alan Harvey, David S. Kittle, Holly Rushmeier, Julie Dorsey, Richard O. Prum, and David J. Brady. *Proceedings of ACM SIGGRAPH 2012*, July 2012. ([doi:10.1145/2185520.2185534](https://doi.org/10.1145/2185520.2185534))

“Spatially- and Directionally-varying Reflectance of Milli-scale Feather Morphology.” Todd Alan Harvey. B-exam Seminar in Zoology and Wildlife Management, Cornell University, May 10, 2012.

“Directional Reflectance from Feather Structure.” Todd Alan Harvey. *Graduate Student Research Symposium at the Yale University Department of Ecology and Evolutionary Biology*, Apr 2012.

“Directional Light Scattering and Feather Appearance.” Todd Alan Harvey. A-exam Seminar in Zoology and Wildlife Management, Cornell University, Feb 1, 2011.

“Feathers: Structures and Appearances.” Todd Alan Harvey. Computer Graphics Seminar, Cornell University, May 7, 2007.

“Fur and Hair: Structural Representation in Feature Film.” Todd Alan Harvey. Computer Graphics Seminar, Cornell University, Oct 23, 2006.

AWARDS AND ACKNOWLEDGEMENTS

I have contributed to numerous projects which received recognition and awards:

Oscar for Best Achievement in Visual Effects

Superman Returns, nominated, 2006

King Kong, 2005

Spiderman 2, 2004

Lord of the Rings: Return of the King, 2003

Lord of the Rings: The Two Towers, 2002

Stuart Little, nominated, 2000

Visual Effects Society Award for Outstanding Visual Effects in a Visual Effects Driven Motion Picture

Charlotte's Web, nominated, 2006

King Kong, 2005

Spiderman 2, nominated, 2004

Lord of the Rings: Return of the King, 2003

Lord of the Rings: The Two Towers, 2002

Annie Awards

Madagascar, nominated for Best Animated Feature, 2006

Eggs of Steel, nominated for Outstanding Achievement in an Animated Interactive Production, 1998

Goldies

Screened in the SIGGRAPH Electronic Theater, Orlando, July 1998.
Awarded first place Mobius Award in the Food & Beverages category, February 1999.

Race for Atlantis

Screened in the SIGGRAPH Electronic Theater, Orlando, July 1998.
Awarded first prize in the theme park category at the World Animation Celebration, March 1998.
Awarded second place in the theme park category at Imagina, March 1998.
Featured in The Walt Disney Company's "Best of Electronic Theater," September 1998.

NEWS MEDIA AND PUBLISHED IMAGES

Cornell Chronicle, "[Alumnus uncovers how cuckoo's feathers shimmer](#)", July 29, 2013
Cinefex Magazine, "[Arachnophilia \(Charlotte's Web\)](#)", Issue 108, January 2007
Cinefex Magazine, "[Return of the King](#)" (King Kong), Issue 104, January 2006
Cinefex Magazine, "[Journey's End](#)" (The Lord of the Rings: The Return of the King), Issue 96, January 2004
Cinefex Magazine, "[Cover Illustration of Gollum in the Dead Marshes](#)", Issue 92, January 2003
Cinefex Magazine, "[Middle-earth Strikes Back](#)" (The Lord of the Rings: The Two Towers), Issue 92, January 2003
Los Angeles Times, "[Gollum's Creation Marries Technology and Art](#)", December 17, 2002

AFFILIATIONS AND ASSOCIATIONS

Membership in Association for Computing Machinery's Special Interest Group on Computer Graphics and Interactive Techniques (AMC SIGGRAPH)

Membership in The Society for Integrative and Comparative Biology (SICB)

VOLUNTEER WORK AND OUTREACH ACTIVITIES

recent years	Troop Committee Member, Boy Scout of America Connecticut Yankee Council Assistance Scout Master, Boy Scout of America Connecticut Yankee Council Merit Badge Counselor, Boy Scout of America
1990–1992	Service mission for the Church of Jesus Christ of Latter-day Saints, Norway Oslo Mission, Oslo, Norway

OTHER

Nature photography
Backpacking
Cycling