Todd Alan Harvey

Laika Entertainment, LLC
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EDUCATION

Yale University, New Haven, CT

2012-2016 Postdoctoral Associate
2011-2012 Visiting Assistant in Research
Advisor Richard O Prum, Ecology and Evolutionary Biology

Ph.D., 2012 **Cornell University**, Ithaca, NY
Thesis Spatially- and Directionally-varying Reflectance of Milli-scale Feather Morphology
Advisors Susan Suarez, Steve Marschner, Ellis Loew, Kimberly S. Bostwick, and John Hermanson
2006-2010 M.S. student in Computer Graphics
Advisors Donald P Greenberg, Steve Marschner, and Kimberly Bostwick

B.A., 1996 Design **Brigham Young University**, Provo, UT
1987-1989 B.S. student in Applied Physics with Computer Applications

RESEARCH AND DEVELOPMENT

2016–present **Laika**, Hillsboro OR
Missing Link (asset look development) CG Look Development Artist
Film 6 pre-production (asset look development)
Film 7 pre-production (asset look development)
also: Implement color pipeline for asset laser scans and reference photography
Implement components of lighting and rendering pipeline (primarily Katana macros and OpScripts)
Modeling the appearance of 3D printed materials

2010–2016 **Yale University**, New Haven CT
Richard O Prum Lab Postdoctoral Associate; Visiting Assistant in Research
3D imaging spectrometer for studying organismal color phenotypes;
Computer modeling of avian courtship displays, plumage morphology and visual signaling.

2007–2009 **Cornell University**, Ithaca NY
Steve Marschner Lab (plumage appearance) Research Assistantship
Donald P Greenberg Lab (plumage appearance) Research Assistantship

2002–2005 **Weta Digital**, Wellington, NZ
King Kong (King Kong's hair appearance) Lead Technical Director
Lord of the Rings (relighting pipeline) Lead Sequence Lighting Technical Director

2001-2002 **Centropolis Effects**, Culver City CA
Willard (rat hair groom and material appearance) R&D Technical Director
Eight Legged Freaks (spider hair groom and material appearance; lighting and rendering pipeline) R&D Technical Director

1993–1994 **Hughes Danbury Optical Systems**, Danbury CT
NASA Chandra X-ray Observatory Junior Engineer
Optical fabrication: predictive polishing strategies target surface figure by computer simulation

1988–1992 **Perkin-Elmer**, Danbury CT

Cynthia Vernold Lab Internships
Optical metrology: developed software component of multiple wavelength scatterometer
Mark Steier Lab Internship
Flexure stress analysis: developed software component of cryogenic test bed

PUBLICATIONS

"Structural absorption by barbule microstructures of super black bird of paradise feathers." Dakota E. McCoy, Teresa Feo, Todd Alan Harvey, Richard O. Prum. *Nature Communications* 9:1, 2018. doi:10.1038/s41467-017-02088-w

Chapter 5: "Leveraging diverse specimen types to integrate behavior and morphology." Kimberly S Bostwick, Todd Alan Harvey, and E Scholes. In *The Extended Specimen: Emerging Frontiers in Collections-based Ornithological Research*, Michael S Webster, ed., *Studies in Avian Biology* 50:75–88, CRC Press, 2017.

"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

"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

"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

"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

MANUSCRIPTS IN PREPARATION

Todd Alan Harvey, Edwin Scholes. Geometry of the courtship display of *Parotia Wahnesi*.

Todd Alan Harvey, Jan Beneš, Edgar Velázquez-Armendáriz, and Richard O. Prum. Visualizing avian plumage in tetrahedral color space.

PUBLISHED DATA AND SOFTWARE

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)

EXHIBITIONS

with David Milewicz, "Hierarchy of structural scale in *Parotia Wahnesi* plumage" in *Under the Skin*, February–November 2020. Bruce Museum, Greenwich, CT.

STUDENT ADVISORY

2018 Georgia Piatt, MS in Optical Sciences, University of Arizona
Thesis: From cell to barbule: the optics of iridescent bird feathers

2015–2016 David Milewicz, BS in Ecology and Evolutionary Biology, Yale University
Thesis: Effect of cross-sectional feather barbule shape on directional light reflectance

TEACHING ASSISTANTSHIPS

Professor Donald P. Greenberg **Cornell University**, Ithaca, NY

2008 Fall *Disruptive Technology;* Johnson Graduate School of Management
2008 Spring *Advanced Computer Animation;* undergraduate course in Art, Architecture and Computer Science
2007 Fall *Computer Animation;* undergraduate course in Art, Architecture and Computer Science
2007 Spring *Disruptive Technology*, Johnson Graduate School of Management
2006 Fall *Visual Imaging in the Electronic Age;* undergraduate course in Art, Architecture and Computer Science

INVITED PRESENTATIONS

"From microscopic feather structure to whole-organism display behavior: using multiple specimen types to uncover the private courtship signals of *Parotia wahnesi* (Paradiseidae)." 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, August 2013.

"From Micro to Whole Animal: New Insights into Plumage Appearance from a Bird's Perspective." Todd Alan Harvey. Biology Colloquium, University of Akron, February 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.

SELECTED PRESENTATIONS

"From microscopic feather structure to whole-organism display behavior: uncovering the private courtship signals of *Parotia wahnesi*." Todd Alan Harvey, Edwin Scholes, Kimberly S. Bostwick, Tim Laman, Steve Marschner. Society for Integrative and Comparative Biology, January 2016.

"Tetrahedral color vectors in 3D: visualizing plumage patterns without human color bias." Todd Alan Harvey, Jan Beneš, Edgar Velázquez-Armendáriz, and Richard O. Prum. Society for Integrative and Comparative Biology, January 2016.

"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, October 2013.

"3D Imaging Spectroscopy for Measuring Organismal Hyperspectral Patterns." Todd Alan Harvey and Richard O. Prum. Society for Integrative and Comparative Biology, January 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, January 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, November 2012.

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

"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, April 2012.

"Directional Light Scattering and Feather Appearance." Todd Alan Harvey. A-exam Seminar in Zoology and Wildlife Management, Cornell University, February 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, October 23, 2006.

VFX SHOT PRODUCTION

2006–2006 — **Rising Sun Pictures**, Adelaide AU
Charlotte's Web (Charlotte) — Lead Lighting Technical Director

2006–2006 — **Rhythm & Hues Studios**, Los Angeles CA
Superman Returns (Fortress of Solitude) — Lighting Technical Director

2004–2005 — **Weta Digital**, Wellington NZ
King Kong (King Kong in New York City) — Lead Technical Director

2004–2004 — **Sony Pictures Imageworks**, Culver City CA
Spiderman 2 (Doc Ock and green screen) — Lighting and Compositing Technical Director

2003–2004 — **Dreamworks Feature Animation**, Glendale CA
Madagascar (Marty's birthday in the Central Park Zoo) — Lighting Artist

2002–2003 — **Weta Digital**, Wellington NZ
Lord of the Rings: Return of the King (Gollum) — Lead Sequence Lighting Technical Director
Lord of the Rings: The Two Towers (Gollum) — Lighting Technical Director

1999–2002 — **Centropolis Effects**, Culver City CA
Eight Legged Freaks (spiders) — R&D Technical Director
The Patriot (soldiers) — 3D Animator
Stuart Little (talking cats) — Sequence Supervisor

1996–1999 — **Rhythm & Hues Studios**, Los Angeles CA
Babe 2: Pig in the City (talking animals) — Technical Director
also: *Goldies* (California cheese commercial), *Eggs of Steel* (Playstation video game), *Race for Atlantis* (stereoscopic OMNIMAX theme park ride), *Colgate* (commercial)

SELECTED AWARDS

I have had the privilege of contributing to numerous projects that have either received or been nominated for Academy Awards, British Academy (BAFTA) Film Awards, Golden Globe Awards, Annie Awards and Visual Effects Society (VES) Awards.

- Visual Effects Society Award for Outstanding Visual Effects in an Animated Feature, *Missing Link*, 2020.
- Golden Globe Award for Best Animated Feature Film, *Missing Link*, 2020.
- Academy Award for Best Achievement in Visual Effects, *King Kong,* 2006.
- VES Award for Outstanding Visual Effects in a Visual Effects Driven Motion Picture, *King Kong*, 2006.
- Academy Award for Best Achievement in Visual Effects, *Spiderman 2,* 2005
- Academy Award for Best Achievement in Visual Effects, *Lord of the Rings: Return of the King,* 2004
- VES Award for Outstanding Visual Effects in a Visual Effects Driven Motion Picture, *Lord of the Rings: Return of the King*, 2004
- Academy Award for Best Achievement in Visual Effects, *Lord of the Rings: The Two Towers,* 2003
- VES Award for Outstanding Visual Effects in a Visual Effects Driven Motion Picture, *Lord of the Rings: The Two Towers*, 2003

Most recently I was recognized along with two colleagues with a nomination for Outstanding Model in a Photoreal or Animated Project by the Visual Effects Society: Todd Alan Harvey, Dan Casey, and Katy Hughes, "The Manchuria" in *Missing Link,* January 2020.

SELECTED PRESS COVERAGE

Variety, "Chris Butler Looks at the Magic Behind Animating 'Missing Link'", Jazz Tangcay, November 12, 2019
Scientific American, "Back to Black: How Birds-of-Paradise Get Their Midnight Feathers", Sid Perkins, Jan 9, 2018
Atlantic, "Super Black is the New Black", Ed Yong, January 9, 2018
Science, "'Superblack' bird of paradise feathers absorb 99.95% of light", Matt Warren, January 7, 2018
Cornell Chronicle, "Alumnus uncovers how cuckoo's feathers shimmer", Krishna Ramanujan, 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

Association for Computing Machinery's Special Interest Group on Computer Graphics and Interactive Techniques (AMC SIGGRAPH); Visual Effects Society (VES); ASIFA-Hollywood; The Society for Integrative and Comparative Biology (SICB)

LABORATORY TOOLSET

Material Science: measurement and analysis of surface structure, spectral and directional reflectance, and color

- Digital imaging
- Laser scanning
- Photogrammetry
- Computed Tomography
- CT analysis and surface extraction (VGStudio MAX)
- Optical scattering simulation (FRED)
- Optical Microscopy
- Spectrophotometry
- Gonioreflectometry
- Imaging Spectroscopy
- Scanning Electron Microscopy
- Transmission Electron Microscopy

- Surface decimation (GeoMagic Wrap)
- Optical Profilometry

Programming/Pipeline
- Shell
- MATLAB
- Maya Embedded Language
- Katana OpScript (Lua)
- Java

Visual Design
- 3D animation (Maya)
- 3D look development and lighting (Katana)
- 3D rendering (Pixar Renderman)
- 2D compositing (Nuke)
- Vector graphics (Illustrator)
- Pixel graphics (Photoshop)

VOLUNTEER WORK AND OUTREACH ACTIVITIES

Recent years	Boy Scouts of America, Cascade Pacific Council, Troop 339 Committee Chair. Boy Scouts of America, Cascade Pacific Council, Troop 589 Committee Chair. Boy Scout of America, Connecticut Yankee Council, Troop 728 Committee Member. Boy Scout of America Connecticut Yankee Council, Troop 728 Assistance Scout Master. Boy Scout of America, Merit Badge Counselor.
1990–1992	Service mission for the Church of Jesus Christ of Latter-day Saints, Norway Oslo Mission, Oslo, Norway

OTHER

Photography, backpacking, cycling