

## Education

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**UNIVERSITY OF CALIFORNIA, SAN DIEGO** September 1997 - September 2006  
**Ph.D. in Computer Science, 2006**  
Research Area: [Computer Graphics](#)  
Advisor: Henrik Wann Jensen  
Dissertation: "Towards Realistic Image Synthesis of Scattering Materials"  
**M.S. in Computer Science, 2004**  
**B.S. in Computer Engineering, 2001** (*magna cum laude*)

## Experience

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**GOOGLE - DEEPMIND** March 2018 - Present  
**DeepMind Senior Staff Science Engineer**  
Applying machine learning to solve real-world scientific problems. Engineering and research across multiple disparate domains in the natural sciences, investigating, inventing, and applying computational techniques towards advancing various disciplines.

**GOOGLE** December 2016 - March 2018  
**Senior Staff Software Engineer**  
Engineering Lead for VR platforms and system software, particularly [Daydream](#). Helped found [OpenXR](#) effort, led development on new VR devices and form-factors, unified multiple VR-related platform software efforts, designed and implemented foundational features in Android OS.

**GOOGLE** June 2015 - November 2016  
**Staff Software Engineer**  
Engineering Lead for VR platforms and system software, including [Google Cardboard](#), [Daydream](#), VR-related implementations in Android OS. Working with external partners to create Daydream-ready devices, including Samsung, Huawei, LG, Motorola, ASUS, Qualcomm, ARM, and others.

**GOOGLE** June 2014 - May 2015  
**Senior Software Engineer**  
Engineer on [Google Earth](#), founding part of [Google Cardboard](#) team, lead Google VR SDK engineer with multiple public release in Java and C++.

**GOOGLE** October 2012 - May 2014  
**Software Engineer**  
Engineer on [Google Earth](#), developing rendering techniques, extending Google infrastructure to support poly-platform products, led effort for unifying rendering engines of Google Earth, Google Maps, and Google StreetView, started Project [Ion](#).

**LEOLUX** September 2009 - September 2012  
**Principal Research Scientist**  
Research coupling computer graphics and biology focused on advanced appearance modeling, appearance acquisition, and biological modeling. Designing custom software to client's specifications, including simulation tools, user interfaces, and other technical packages.

**COLUMBIA UNIVERSITY** October 2007 - September 2009  
**Postdoctoral Research Scientist, Department of Computer Science**  
Host: Ravi Ramamoorthi  
Research in computer graphics focused on advanced appearance modeling, measurement techniques, complex light transport, and global illumination.

**UNIVERSITY OF CALIFORNIA, SAN DIEGO** September 2006 - September 2007  
**Postdoctoral Researcher, Department of Computer Science and Engineering**  
 Host: Henrik Wann Jensen  
 Research in computer graphics focused on appearance modeling, complex light transport, and global illumination.

**WETA DIGITAL LTD.** November 2006  
**Consultant, Shaders and Rendering Group**  
 Development and implementation of advanced shading techniques for materials such as skin and leaves. Results used in the movie *Avatar*.

**UNIVERSITY OF CALIFORNIA, SAN DIEGO** October 2002 - September 2006  
**Graduate Student Researcher, Department of Computer Science and Engineering**  
 Assisted in the design and construction of the Graphics and Vision Lab. Performed research in the areas of interactive full global illumination rendering, appearance modeling, and light transport simulation. Administrator of Linux and Windows machines, including multi-node clusters.

**CALIT<sup>2</sup>** June - September 2003  
**Graduate Student Researcher, Center for Research in Computing and the Arts**  
 Implemented high-end content creation tools for the creation of a digital immersive environment.

**SAN DIEGO SUPERCOMPUTER CENTER** June 1999 - June 2003  
**Graduate Student Researcher, Visualization Lab**  
 Assisted in the design and construction of a tiled display, developed tools for display super high-resolution images and movies.

**SHELDON BROWN, INC.** July 2001 - April 2002  
**Lead Programmer**  
 Designed and implemented an immersive 3D environment engine, and design tools for content production. Project is currently on display at the Ruben H. Fleet Science Center in San Diego's Balboa Park.

**SAN DIEGO SUPERCOMPUTER CENTER** June 1999 - July 2000  
**Undergraduate Student Researcher, Visualization Lab**  
 Developed drivers for 3D input devices, designed and implemented a parallel visualization tools.

**KNOWLEDGE ADVENTURE/DAVIDSON & ASSOC.** June - August 1998  
**Lead Programmer**  
 Lead development of an educational software package for children.

## Research Interests

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At DeepMind, I am exploring applying computational methods and machine learning towards solving problems in the natural sciences.

In the past my core focus was on computer graphics rendering [3,5,7,11,13] and appearance modeling [1,6,9,10,12], developing algorithmic models that succinctly describe the appearance of the natural world. Real-world materials, like milk, hair, and skin, scatter light within their volume. Simulating this complex interaction has a high computational cost, thus efficient models are necessary. These models are useful not only for generating realistic imagery, but also for medical diagnosis [1,2], studies on appearance (e.g. health, beauty, age of skin) [3,9], and for investigating the optical properties of materials [1,5,6,8,14,15].

## Honors and Awards

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- Proceedings Front Cover Image, *SIGGRAPH Asia*, 2010
- Proceedings Front Cover Image, *SIGGRAPH Asia*, 2008
- Proceedings Front Cover Image, *Graphics Hardware*, 2003
- Best Paper of Conference Award, *Graphics Hardware*, 2003

## Peer-Reviewed Journal Articles

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- [1] **C. Donner** and H. W. Jensen. *Rapid simulation of steady-state spatially-resolved reflectance and transmittance profiles of multi-layered turbid materials*. *J. Opt. Soc. Am. A*, 23(6):1382–1390, 2006
- [2] N. Joshi, **C. Donner**, and H. W. Jensen. *Noninvasive measurement of scattering anisotropy in turbid materials by nonnormal incident illumination*. *Opt. Lett.*, 31:936–938, 2006

## SIGGRAPH/ToG Papers

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- [3] J. Jimenez, T. Scully, N. Barbosa, **C. Donner**, X. Alvarez, T. Vieira, P. Matts, V. Orvalho, D. Gutierrez, T. Weyrich. *A practical appearance model for dynamic facial color*. *ACM Trans. Graphic.* (Proceedings of SIGGRAPH Asia 2010), 29(6):141:1–10, 2010  
**(Proceedings front cover)**
- [4] R. Overbeck, **C. Donner**, R. Ramamoorthi. *Adaptive wavelet rendering*. *ACM Trans. Graphic.* (Proceedings of SIGGRAPH Asia 2009), 28(5):140:1–12, 2009
- [5] **C. Donner**, J. Lawrence, T. Hachisuka, H. W. Jensen, S. Nayar, R. Ramamoorthi *An Empirical BSSDF Model*, conditionally accepted to *ACM Trans. Graphic.* (Proceedings of SIGGRAPH 2009), 28(3), 2009
- [6] **C. Donner**, T. Weyrich, E. d’Eon, S. Rusinkiewicz, and R. Ramamoorthi. *A layered, heterogeneous reflectance model for acquiring and rendering human skin*. *ACM Trans. Graphic.* (Proceedings of SIGGRAPH Asia 2008), 27(5):140:1–12, 2008  
**(Proceedings front cover)**
- [7] W. Jarosz, **C. Donner**, M. Zwicker, and H. W. Jensen. *Radiance Caching for Participating Media*. *ACM Trans. Graphic.*, 27(1):1–11, 2008
- [8] S. G. Narasimhan, M. Gupta, **C. Donner**, R. Ramamoorthi, S. Nayar, and H. W. Jensen. *Acquiring scattering properties of participating media by dilution*. *ACM Trans. Graphic.* (Proceedings of SIGGRAPH 2006), 25:1003–1012, 2006
- [9] T. Weyrich, W. Matusik, H. Pfister, B. Bickel, **C. Donner**, C. Tu, J. McAndless, J. Lee, A. Ngan, H. W. Jensen, and M. Gross. *Analysis of human faces using a measurement-based skin reflectance model*. *ACM Trans. Graphic.* (Proceedings of SIGGRAPH 2006), 25:1013–1024, 2006
- [10] **C. Donner** and H. W. Jensen. *Light diffusion in multi-layered translucent materials*. *ACM Trans. Graphic.* (Proceedings of SIGGRAPH 2005), 24(3):1032–1039, 2005

## Peer-Reviewed Conference Papers

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- [11] **C. Donner** and H. W. Jensen. *Rendering translucent materials using photon diffusion*. In *Rendering Techniques (Proceedings of the Eurographics Symposium on Rendering)*, pages 243–251, 2007
- [12] **C. Donner** and H. W. Jensen. *A spectral BSSRDF for shading human skin*. In *Rendering Techniques (Proceedings of the Eurographics Symposium on Rendering)*, pages 409–417, 2006
- [13] T. J. Purcell, **C. Donner**, M. Cammarano, H. W. Jensen, and P. Hanrahan. *Photon mapping on programmable graphics hardware*. In *Graphics Hardware*, pages 41–50, 2003  
**(Proceedings front cover and awarded best paper of conference)**

## Other Publications

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- [14] W. Jarosz, **C. Donner**, M. Zwicker, and H. W. Jensen. *Radiance Caching for Participating Media*. In *ACM SIGGRAPH Sketches and Applications*, 2007
- [15] **C. Donner**. *Towards Realistic Image Synthesis of Scattering Materials*. Ph.D. Dissertation, University of California at San Diego, 2006
- [16] **C. Donner** and H. W. Jensen. *A spectral shading model for human skin*. In *ACM SIGGRAPH Sketches and Applications*, 2006
- [17] B. Bickel, T. Weyrich, W. Matusik, H. Pfister, **C. Donner**, C. Tu, J. McAndless, J. Lee, A. Ngan, H. W. Jensen, and M. Gross. *Processing and editing of faces using a measurement-based skin reflectance model*. *ACM SIGGRAPH Sketches and Applications*, 2006
- [18] **C. Donner**. *Photon mapping methods on programmable graphics hardware*. Master's thesis, University of California at San Diego, 2004
- [19] **C. Donner** and H. W. Jensen. *Faster GPU computations using adaptive refinement*. In *ACM SIGGRAPH Sketches and Applications*, 2004

## Teaching

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### ACM SIGGRAPH

SIGGRAPH 2009 Course, *Scattering*: Instructor

SIGGRAPH 2008 Course, *Advanced Global Illumination*: Guest Instructor

### UNIVERSITY OF CALIFORNIA, SAN DIEGO

CSE 168, *Rendering Algorithms*, Spring 2004: Teaching Assistant/Lecturer

CSE 167, *Introduction to Computer Graphics*, Fall 2003: Teaching Assistant/Lecturer

CSE 190B, *Advanced Topics in Computer Science*, Spring 2002: Teaching Assistant/Lecturer

CSE 167, *Introduction to Computer Graphics*, Spring 2001: Teaching Assistant

CSE 167, *Introduction to Computer Graphics*, Spring 2000: Teaching Assistant

CSE 30, *Computer Architecture*, Fall 1998: Tutor/Teaching Assistant

## Professional Activities

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Technical Papers Committee Member: Eurographics Symposium on Rendering 2008, 2009, 2010, 2012, Eurographics 2012.

Reviewer: ACM SIGGRAPH, ACM Journal of Graphics Tools, ACM Transactions on Graphics, Computer Graphics Forum, Eurographics, Eurographics Symposium on Rendering, IEEE Transactions on Visualization and Computer Graphics, IEEE Computer Graphics and Applications, Journal of the Optical Society of America A, Optics Express, Optics Letters, Applied Optics.

## Academic References

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