

# Ravi Ramamoorthi

Computer Science and Engineering  
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## EDUCATION

- 6/98-8/02 **Stanford University**  
Ph.D. in Computer Science (Research Area: Computer Graphics and Computer Vision)  
Thesis: *A Signal-Processing Framework for Forward and Inverse Rendering*
- 9/94-6/98 **California Institute of Technology**  
B.S. in Engineering and Applied Science, M.S. in Computer Science, M.S. in Physics

## EMPLOYMENT

- 3/16– **University of California, San Diego**, Ronald L. Graham Professor of Computer Science  
7/15– Director, UC San Diego Center for Visual Computing  
7/14– Professor of CSE; affiliate in ECE
- 7/09– 6/14 **University of California, Berkeley**, Associate Professor of EECS (promoted to full 7/1/14)  
1/09– 6/09 **University of California, Berkeley**, Acting Associate Professor of EECS  
1/07–12/08 **Columbia University**, Associate Professor of Computer Science (tenure effective 7/1/08)  
9/02–12/06 **Columbia University**, Assistant Professor of Computer Science

## SELECTED AWARDS AND HONORS

*Frontiers of Science Award* at Second International Congress on Basic Science, for most impactful papers in past 5-10 years (1 of 26 in computer science for Local Light Field Fusion from 2019) Beijing, Jul 2024.

*Seminal Graphics Papers Selection* in volume 2 for 50<sup>th</sup> SIGGRAPH. Paper “A Signal-Processing Framework for Inverse Rendering” (2001) was chosen as 1 of 11 in rendering (88 overall) in 25+ years, Aug 2023.

*Frontiers of Science Award* at First International Congress on Basic Science, for most impactful papers in past 5 years (1 of 32 in computer science for work on Neural Radiance Fields from 2020) Beijing, Jul 2023.

*ACM SIGGRAPH Academy*, for groundbreaking theoretical work in mathematical representations of visual appearance, and for translating these into computational methods with wide practical impact, Aug 2019.

*Dissertation Awards to PhD students:*

- ACM Dissertation Award Honorable Mention: Pratul Srinivasan, Ben Mildenhall (collaborator) 2022
- UCSD CSE Dissertation Award: Zhengqin Li (collaborator) 2022, Sai Bi 2021
- UCSD Chancellor’s Dissertation Medal: Zexiang Xu 2021
- ACM SIGGRAPH Outstanding Doctoral Dissertation Award: Lingqi Yan 2019.
- Awards to Former Student Collaborators: ACM Dissertation Award, Ren Ng 2006; ACM SIGGRAPH Dissertation Award, Jun-Yan Zhu 2018, Tzu-Mao Li 2020, Cheng Zhang 2023.

*ACM Fellow* for contributions to computer graphics rendering and physics-based computer vision, Dec 2017.  
*edX Prize for Exceptional Contributions in Online Teaching and Learning* (One of 10 finalists in all subjects worldwide; only recipient in computer science and only two-time finalist; presented Vancouver, Dec 2017).

*IEEE Fellow* elevation for contributions to foundations of computer graphics and computer vision, Jan 2017.  
*edX Prize for Exceptional Contributions in Online Teaching and Learning* (One of 11 finalists worldwide for inaugural edX prize; announced and finalists presented at edX global forum in Paris, Nov 2016).

*Ronald L. Graham Chair of Computer Science* Inaugural holder of endowed chair, UC San Diego, Jan 2016.

*ACM Distinguished Scientist* elevation for significant impact on the computing field, Nov 2015.

*5 Google and Google Virtual Reality Research Awards*, 2014-2018.

*Okawa Foundation Research Grant* “A Digital Visual Appearance Pipeline in Computer Graphics” (6 awards in the USA in Information Technology in 2011), Nov 2011.

*Eurographics Recognition of Service Award*, for service as papers co-chair of EGSR, Eurographics, 2011.

*Best Paper and Image Awards:* Best paper at EGSR 2024, Best paper honorable mention at ECCV 2022 (3 awarded papers of 5803 submissions), Best paper honorable mention at ECCV 2020 (3 awarded papers of 5150 submissions; invited to CACM), Honorable mention for best paper at SciVis 2014, Best paper at 2011 ACM Symposium on Interactive 3D graphics, Cover image of inaugural Siggraph Asia 2008, Inset page of Siggraph 2011, Cover of 2012 Computer Graphics Forum, Cover of April 2013 ACM Transactions on Graphics.

*Presidential Early Career Award for Scientists and Engineers* (The PECASE is conferred by the President and is the highest honor bestowed by the US Govt on early career researchers), White House, Dec 19, 2008.

*ACM SIGGRAPH Significant New Researcher Award* (highest early career award for computer graphics researchers; 1 award made per year among all “new” academic/industrial researchers), Aug 2007. See video introducing my work at <https://www.youtube.com/watch?v=qpyCXqXGe7I>

*ONR Young Investigator Award* “Mathematical Models of Illumination and Reflectance for Image Understanding and Machine Vision” (2 awards per year in computer science), Office of Naval Research, Mar 2007.

*Sloan Fellowship in Computer Science* (16 awards per year in computer science to junior faculty; only award in computer graphics in 2005), Alfred P. Sloan Foundation, Sep 2005.

*NSF CAREER Award*, “Mathematical and Computational Fundamentals of Visual Appearance for Computer Graphics” (usually 3 awards per year in computer graphics), National Science Foundation, Feb 2005.

*Stanford Graduate Fellowship* (awarded to 1% of PhD applicants), 1998-2002.

*Green Prize for Creative Scholarship*, California Institute of Technology (1 or 2 awards made per year among all undergraduates for outstanding research), 1997.

*2<sup>nd</sup> All-India Rank*, IIT JEE (of 200,000+ candidates for the Indian Institute of Technology), 1994.

*2<sup>nd</sup> Place Worldwide*, International Computer Problem Solving Contest, Elementary BASIC Division, 1992.

## IMPACT SUMMARY

**Academic Research Impact:** More than 200 papers, and among first 5 researchers worldwide and youngest to publish 100 papers at ACM SIGGRAPH/TOG [milestone reached in 2024], with an h-number of 82 (35,000+ total citations, including at least 24 of 94 papers at recent SIGGRAPH Asia 2021). 50+ papers cited 100+ times according to Google Scholar. 13 of these are cited more than 500 times. See page 12 for publications. Twenty significant awards. Six major early career awards including White House PECASE and ACM Siggraph Significant New Researcher. Elevated to both IEEE and ACM fellow in 2017, inducted into SIGGRAPH Academy in 2019. 9 best paper and cover images as listed on page 1.

**Educational Impact:** Developed complete graphics curricula at Berkeley, Columbia, UCSD. Taught first-ever open online computer graphics course (edX, Nov 5–Dec 17, 2012), with 15,000 registered students of whom 892 received completion certificates. With re-offerings Mar-Apr and Oct-Dec 2013-24, total of more than 100,000 registered students in all 10+ classes, with more than 2,500 completions. Licensing by XuetangX for translation (public offering in Mandarin in Fall 2014). Public online lectures available at <http://www.youtube.com/user/raviramamoorthi> have received more than 700,000 views and 6,000+ subscribers. UCSD CSE 167x featured as one of top 3 courses among all MOOCs on Class Central Aug 2015. Currently offered as part of first professional certificate in virtual reality. I was one of 11 finalists across all subject areas worldwide for *inaugural edX Prize for exceptional contributions in online teaching and learning* in 2016, and again in 2017 (only Computer Science recipient and only two-time finalist). New course CSE 168 Computer Graphics II: Rendering first CSE course on UCSD Online Sep 1, 2020 (now on edX).

**Mentoring Impact and Students:** 30+ Postdoctoral, Ph.D. students graduated plus many collaborators; see page 6 (4 advisees currently tenure-track faculty, 15 in research labs, many collaborators now faculty).

Students won industry/govt fellowships for our work: Microsoft (Ren Ng, Charles Han), Intel (Ryan Overbeck), ATI (Charles Han), NSF (Michael Tao, Pratul Srinivasan, Alex Trevithick), NSERC (Wesley Chang), NDSEG (Pratul Srinivasan), Siebel (Brandon Wang), NVIDIA (Soham Mehta, LingQi Yan, Lifan Wu), Adobe (Zexiang Xu), Google (Tiancheng Sun), Qualcomm (Jiyang Yu, Sai Bi, Kaien Lin, Ishit Mehta). LingQi Yan won 2019 ACM SIGGRAPH Outstanding Doctoral Dissertation Award, the first winner in the sub-area of rendering. Earlier, he received the 2017-18 CV Ramamoorthy Distinguished Research Award (best graduate research at UC Berkeley CS, first time in computer graphics in 22 years of this award). Jingwen Wang won the 2017-18 UCSD CSE M.S. research award, Zexiang Xu received the 2018-19 UCSD CSE Ph.D. research award, Guangyan Cai received the 2019-20 UCSD CSE Undergraduate Research Award followed by Venkataram Sivaram in 2023-24, Sai Bi received the 2020-21 UCSD CSE Ph.D. Dissertation Award, the first such awards in computer graphics. Zexiang Xu won the 2020-21 UCSD Chancellor’s Dissertation Medal across all of engineering. Pratul Srinivasan shared the 2020-21 Berkeley EECS Sakrison Award for “a truly outstanding piece of research” and subsequently an honorable mention for the 2022 ACM Doctoral Dissertation Award (with long-term collaborator Ben Mildenhall, only the second recognition of vision/graphics in 12+ years). Former postdoc Manmohan Chandraker won the CVPR 2014 best paper award for line of work started at Berkeley, and subsequently a 2018 NSF CAREER award.

**Most Significant Industrial Impact:** Spherical Harmonic (SH) Lighting, introduced in my dissertation (2001, 2002) [5,103] is now standard in video games (e.g., Halo series) and movies (a standard feature in

RenderMan 16, from mid-2011). It is also now included in standard textbooks (OpenGL red book, Real-Time Rendering book, PBRT). My early work [4] was one of 11 rendering papers over 25+ years included in SIGGRAPH's seminal graphics papers volume 2. Weta Digital received an Academy of Motion Pictures Technical Certificate in 2014 for their implementation of SH lighting in Avatar (2010). Spherical harmonics are also the method of choice for modeling environment illumination in many computer vision applications. Early work (2009) on sampling and reconstruction for Monte Carlo (MC) rendering [30,31] has inspired MC denoising algorithms used in almost all production renderers, and is identified as seminal in a EuroGraphics STAR report [128]. Subsequent work (2012) developed the first real-time reconstruction methods for denoising interactive physically-based renderers [41], which has inspired modern real-time AI-based denoisers, integral to NVIDIA's real-time raytracing software (Optix 5 in 2017) and hardware (RTX real-time raytracing chips in 2018). As a result, physically-based (raytraced) rendering with denoising is now a reality, and an integral part of both offline and real-time rendering pipelines.

Work on Neural Radiance Fields or NeRF [145,205] (2020) is cited thousands of times a year, and is widely used to reconstruct 3D environments by amateurs and professionals. NeRF has received an inaugural Frontiers of Science Award, been used in Google's Maps, StreetView and shopping applications, by many startups such as the Luma AI mobile phone app, been highlighted by Meta CEO Zuckerberg for the Metaverse, and used by the New York Times for capturing portraits. Subsequent work from NVIDIA on Instant NeRFs was named one of Time Magazine's best inventions of 2022.

Importance sampling methods (2003, 2004) [8,10] are now widely adopted in movie production, built into RenderMan 16. I have consulted and collaborated with Pixar in this regard [119,120]. Methods based on unstructured light in spacetime stereo (2003) [106,153] are widely used in 3D RGBD sensors. I participated in development of the first electronic field guide for identification of plant species in 2008 [109,167]; the subsequent Leafsnap iPhone app received the EO Wilson Biodiversity Technology Award in 2011. Our new fur reflectance model (2015) [52] has been used for all animal fur in the movie War for the Planet of the Apes (Weta Digital special effects, 2017). New glint models (2014-16) [49,55] have been used in commercial renderers (AutoDesk Fusion 360) and video games (glints off snow in Rise of the Tomb Raider, 2016). Our work on selfie video stabilization [140,197] was the precursor to Google's Steadiface algorithm on Pixel 3 phones. Single image portrait relighting [72] is included in recent Pixel phones.

**Research Groups:** Leadership role in building top graphics/vision multi-faculty groups; see below.

## RESEARCH GROUPS

Key role, with colleagues, in building leading multi-faculty research groups: UC San Diego Center for Visual Computing (VisComp; started Apr 2015), Visual Computing Lab (VCL) at UC Berkeley (started Jul 2011) and Columbia Vision and Graphics Center (CVGC; started Jan 2003). Significant increase in impact and visibility of graphics and vision research. Columbia went from 0 SIGGRAPH papers in the prior four years to leading all universities with 10 papers at SIGGRAPH 2006. Berkeley went from a 20% yield of graphics PhD admits in 2009/10 to arguably being the leading graphics group within the VCL in 2013-14.

When I arrived at UCSD in Jul 2014, tasked with (re)building visual computing, there were 0 active computer vision faculty in CSE and 0 Ph.D. students in computer graphics owing to leaves and departures. I have played a key leadership role as founder and inaugural director of the UC San Diego Center for Visual Computing <http://viscomp.ucsd.edu> now with 10+ faculty spanning vision and graphics in computer science, virtual reality in CalIT2, and visual processing in cognitive science, and with at least four new junior faculty hires in computer science. The recent 2022 retreat had 100+ registrations, including faculty, graduate students and industrial sponsors. UCSD faculty had 20 papers at CVPR 2017, 25 each at CVPR, ICCV 2021 and 10 papers each at SIGGRAPH 2021, 2022 (latter more than any other US University in 2022). Ours is one of the first three new agile research centers, with significant industry support from 10+ industrial sponsors. VisComp launched Apr 16, 2015 at the Jacobs Research Expo. Press includes an article at UT San Diego, The research metrics-based ranking site [csrankings.org](http://csrankings.org) ranked *UCSD #1 in each of computer graphics, computer vision, and visual computing (vision and graphics) for the period 2021-2023* (retrieved as of Apr 23). *Earlier, in the time period (2015-2020), my individual 5-year "ranking" was #1 in graphics nationally and #1 among all UCSD faculty.* An article describing my efforts at leading multi-faculty research groups is available at: <https://cseweb.ucsd.edu/~ravir/book.pdf> with another article on faculty life at <https://cseweb.ucsd.edu/~ravir/book2.pdf>

## SELECTED INVITED TALKS (since 2012)

- Sep 2024 “Sampling and Signal-Processing for High-Dimensional Visual Appearance in Computer Graphics and Vision” *Distinguished Lecture, Carnegie Mellon University*
- Jul 2024 “Sampling for View Synthesis: From Local Light Field Fusion to Neural Radiance Fields and Beyond” *International Congress on Basic Science, Beijing China*
- Apr 2024 “Image-Based Rendering: From View Synthesis to Neural Radiance Fields and Beyond” *Keynote at Computational Visual Media, Wellington, New Zealand, Keynote at Eurographics, Limassol, Cyprus*
- , Feb 2024 “Neural Radiance Fields for View Synthesis and Beyond” *Distinguished Lecture, Boston University (Virtual), National Research Partnership, San Diego [Mar], Keynote at IEEE Multimedia Information Processing and Retrieval [Aug]*
- Jul 2023 “Neural Radiance Fields for View Synthesis and Beyond” *International Congress on Basic Science, Tsinghua University, Beijing, China*
- Jun 2023 “Light Field Signal Processing” *Keynote at CVPR Light Field Workshop, Vancouver*
- Oct 2022 “Neural Radiance Fields for View Synthesis with Deep Learning” *MURI meeting (Rice, Virtual)*
- Aug 2022 “Light Field Representations” *Patfest, Stanford University*
- Apr-May 2022 “Capturing Realistic Virtual Experiences with Light Fields” *University of Maryland, Google, Keynote at Machine Learning for Content Creation*
- Nov 2021 “Neural Radiance Fields” *3D Metrology 2021*
- Mar-Oct 2021 “Capturing Realistic Virtual Experiences with Light Fields” *Distinguished Lecture, Univ. Wisconsin, Keynote Machine Learning Signal Processing, Qualcomm, Amazon*
- Aug 2020 “Light Fields and View Synthesis from Sparse Images: Revisiting Image-Based Rendering” *Keynote at AIM Workshop, ECCV 2020*
- Sep 2019 “Sampling and Reconstruction of High-Dimensional Visual Appearance”, *EPFL Distinguished Lecture Series, Lausanne Switzerland*
- Jan-Nov 2019 “Light Fields: From Shape Recovery to Sparse Reconstruction”, *Electronic Imaging San Jose, Google Los Angeles, SPIE Applied Optical Metrology, San Diego, Stanford University Imaging Science Seminar, Proprio Vision [Feb 2021]*
- Jan 2018 “Deep HDR Dynamic Image Reconstruction”, *Invited Speaker at SPIE Electronic Imaging 2018, San Jose*
- Oct 2017 “Real-Time Photorealistic Rendering and Mixed Reality” *Seminar at Qualcomm, San Diego*
- Jul 2017 “Light Fields: From Shape Recovery to Sparse Reconstruction”, *Keynote at Light Fields for Computer Vision CVPR Workshop, Honolulu*
- Nov 2016 “Sampling and Reconstruction of High-Dimensional Visual Appearance”, *Seminar at Max Planck Institute, Saarbrücken*
- Dec 2015 “Sampling and Reconstruction of High-Dimensional Visual Appearance”, *Keynote at International Symposium on Visual Computing, Las Vegas*
- Sep 2015 “Filtering Environment Illumination for Interactive Physically-Based Rendering in Mixed Reality” *Invited Speaker, Future of Virtual Reality Conference, San Diego*
- May 2015 “Sampling and Reconstruction of High-Dimensional Visual Appearance”, *Computer Science Seminar, UC Irvine*
- Feb 2014 “Sampling and Reconstruction of High-Dimensional Visual Appearance”, *Distinguished Lecture, University of California, San Diego, ECE Colloquium [Dec 2014]*
- Oct-Nov 2013 “Sampling and Reconstruction of High-Dimensional Visual Appearance”, *Keynote at CAD/Graphics 2013, Hong Kong (co-located with SIGGRAPH Asia), ICT USC*
- Jan 2013 “Sparse and Multiresolution Representations of Visual Appearance”, *Speaker in Invited Session, Joint Mathematics Meeting 2013, San Diego*
- Oct 2012 “Physics-Based Vision: From Complex Lighting to Volumetric Scattering”, *Keynote at 2012 ECCV Color and Photometry Workshop*

## TEACHING

CS 148 (Stanford)	Introductory Computer Graphics, Summer 2001. Instructor for course.
SIGGRAPH 2002	Course Organizer (with Marschner): Acquiring Material Models by Inverse Rendering
COMS 4160 (Columbia)	Computer Graphics. Redesigned introductory undergraduate graphics course, and taught it each year, usually in fall. Spring 2003 (45 students), Fall 2003-2006, Spring 2008, Fall 2008.
COMS 4162 (Columbia)	Advanced Computer Graphics. Developed new undergraduate course. Spring 2005 (25 students), Spring 2006 (14 students). Was intended to be offered in alternate years.
COMS 6160 (Columbia)	Topics in Computer Graphics. Developed new graduate course taught every two years (content changes with each offering). Fall 2002 COMS 6998 Appearance Models (9 students), Fall 2004 Real-Time High Quality Rendering (23 students), Spring 2007 Visual Appearance Representations for Rendering (17 students).
CS 283 (Berkeley)	Developed CS 283 (earlier 294-13) as the basic graduate graphics course, taught yearly in the fall. First version co-taught with Prof. O'Brien in Fall 2009 (21 students), and sole instructor in Fall 2010 (8 students) and Spring 2013 (21 students).
CS 184 (Berkeley)	Reorganized, modernized and taught CS 184, Foundations of Computer Graphics (undergraduate graphics course) in Spring 2010 (77 students), Spring 2012 (90 students), Fall 2012 (94 students). Developed widely viewed online lectures and course material.
CSE 184.1x/167x (edX)	Taught first-ever open online computer graphics course on edX (6 week class covering key material in CS 184). First offering Nov 5–Dec 17, 2012; next offerings Mar 18–Apr 29, Oct 7–Nov 18, 2013, Oct 6–Nov 17, 2014. Offered as first UC San DiegoX course CSE 167x after transition to UCSD Aug 17–Sep 28, 2015; self-paced Dec 1, 2015–Mar 31, 2016; May 1–Sep 30, 2016. Now part of virtual reality professional certificate, Jun 1, 2017–Aug 31, 2017; re-offered 2017-18, 2018-present. First offering: 15,000 enrolled students; 892 received completion certificates; Second: 20,000 students, 535 completions; Third: 21,000 students, 520 completions; Fourth: 7,500 students; 200 completions. First UC San Diego X CSE 167x offering: 19,000 students, 324 completions; 321 self-paced completions. Licensed by Queen Rania Foundation and XuetangX for translation into Arabic and Mandarin respectively. Mandarin MOOC offered Fall 2014.
CSE 274 (UCSD)	Topics in Computer Graphics. New graduate course to cover advanced topics (content may change with each offering). Winter 2015 Real-Time High Quality Rendering (CSE 291, 16 students), Fall 2015 (15 students). Winter 2018 Sampling and Reconstruction of Visual Appearance (18 students). Offered Fall 2018 and annually.
CSE 167 (UCSD)	Computer Graphics. Modernized graphics course, including first use of edX edge, code and image graders, and modern OpenGL 3.1. Wi17 (120 students), Wi19 (140 students), Wi22 (154 students). Wi23 (128 students), offered annually.
CSE 163 (UCSD)	Advanced Computer Graphics. New course follow-on to CSE 167, Spr 2015 (CSE 190, 34 students), Win 2016 (35 students), Spr 2017 (59 students), Spr 2018 (35 students).
CSE 168 (UCSD)	Computer Graphics II: Rendering. Redesigned course on modern Monte Carlo rendering, including image graders on edX edge. Sp20 (44 students), Sp21, Sp24, Sp25. Concurrent online course (MOOC) offered via UCSD Online, edX since Sep 1, 2020.

## STUDENT COLLABORATORS AND ADVISEES

### Current Ph.D. (co-)advisees (12)

- Ishit Mehta [Qualcomm Innovation Fellow] (with Manmohan Chandraker, since Sep 2019)
- Mohammad Sina Nabizadeh (with Albert Chern, since Sep 2020)
- Bing Xu (since Sep 2020)
- Nithin Raghavan (since Aug 2021)
- Yash Belhe [Jacobs School Fellowship] (with Tzu-Mao Li, since Sep 2021)
- Alex Trevithick [Jacobs School, NSF Fellowship] (since Sep 2021)
- Wesley Chang [NSERC Fellowship] (with Tzu-Mao Li, since Sep 2022)
- Liwen Wu (since Sep 2022)
- Mustafa Yaldiz (since Sep 2022)
- Mukund Varma [Jacobs School Fellowship] (with Hao Su, since Sep 2023)
- Zilu Li [Jacobs School Fellowship] (with Tzu-Mao Li, since Jul 2024)
- Jiamu Sun (since Sep 2024)

**BS/MS advisees (2):** Kaiwen Jiang [MS] (since Sep 2023), Venkataram Sivaram [BS] (since Sep 2022)

## ALUMNI

- *Postdoc (9)*:
  - Simon Premoze [was at ILM] (Oct 2003–Mar 2005)
  - Craig Donner [now at DeepMind] (Oct 2007-Aug 2009)
  - Adrien Bousseau [Eurographics 2011 PhD Award, now researcher at INRIA Sophia-Antipolis] (Nov 2009-Oct 2010)
  - Manmohan Chandraker [full professor at UCSD; head of vision at NEC Labs] (Sep 2009-May 2011)
  - Huamin Wang [Style3D; was tenured Associate Professor at Ohio State] (Oct 2009-May 2011)
  - Milos Hasan [now at Adobe Research] (Oct 2010-Sep 2012)
  - Dikpal Reddy [now at Facebook Reality Labs] (Sep 2011-Jun 2013)
  - Eno Toppo [was at Magic Leap] (Oct 2013-Sep 2014)
  - Nima Khademi Kalantari [now Assistant Professor at Texas A&M University] (Jan 2016-Jun 2018)
- *Ph.D. students (21)*:
  - Aner Ben-Artzi [started at Sony, Google] (since Jan 2003: Ph.D. deposit May, 2007)
  - Bo Sun [now at Virtu Financial] (since Jan 2004 : Ph.D. deposit Aug, 2008)
  - Dhruv Mahajan [now at Facebook Research] (since Jan 2006 : Ph.D. deposit Aug, 2009)
  - Ryan Overbeck [now at Google] (since Sep 2006 : Ph.D. deposit Aug, 2009)
  - Jinwei Gu [now associate professor at Chinese University of Hong Kong, NVIDIA] (since Sep 2005 : Ph.D. deposit *with distinction* May, 2010)
  - Charles Han [now at Google] (since Jan 2006 : Ph.D. deposit Jun 2011)
  - Kevin Egan [now at Cubist] (since Sep 2006 : Ph.D. deposit Aug 2011)
  - Jiamin Bai [now at ASTAR Singapore] (since Jan 2010 : Ph.D. deposit Dec 2014)
  - Soham Mehta [now at Apple] (since Aug 2011 : Ph.D. deposit May 2015)
  - Michael Tao [now at Apple] (since Aug 2010 : Ph.D. deposit Sep 2015)
  - Ting-Chun Wang [now at NVIDIA Research] (since Sep 2013 : Ph.D. deposit May 2017)
  - Ling-Qi Yan [*SIGGRAPH PhD Award, CV Ramamoorthy Distinguished Research Award*, now tenured Associate Professor at UCSB] (since Aug 2013: Ph.D. deposit Jun 2018)
  - Zachary Murez [was at Magic Leap] (since Sep 2014 : Ph.D. deposit Jun 2018)
  - Zexiang Xu [*CSE PhD award, Chancellor's Dissertation Medal*, now at Adobe Research] (since Sep 2015; PhD deposit Jun 2020)
  - Lifan Wu [now at NVIDIA Research] (since Sep 2015; PhD deposit Jul 2020)
  - Pratul Srinivasan [*ACM Dissertation Award Honorable Mention, Sakrison Memorial Prize*, now at Google Research] (since Sep 2014; PhD deposit Dec 2020)
  - Jiyang Yu [now at Google] (since Jun 2015; PhD deposit Dec 2020)
  - Sai Bi [*CSE Dissertation Award*, now at Adobe Research] (since Sep 2015; PhD deposit Mar 2021)
  - Tiancheng Sun [*ACM Undergraduate Grand Prize*, now at Google Research] (since Sep 2017; PhD deposit Jul 2021)
  - Alexandr Kuznetsov [now at AMD Research] (since Sep 2016; PhD deposit Jun 2022)
  - Kaijen Lin [now at Apple] (since Sep 2018; PhD deposit Jun 2023)
- *Ph.D. (co-)advisee (1)*: Jason Lawrence [now at Google; was tenured faculty at Univ. Virginia, NSF CAREER Award 2008] (Princeton, advisor Szymon Rusinkiewicz, since Jun 2003: Ph.D. Jun 2006)
- *Selected Ph.D. student and Postdoc collaborators*: Ren Ng [Microsoft Fellow, winner of 2006 ACM doctoral dissertation award, founder of Lytro, now associate professor at Berkeley, winner of Sloan Fellowship] (Stanford, advisor Pat Hanrahan, May 2002-Jan 2004), Margarita Osadchy [now faculty, University of Haifa] (NEC Labs, advisor David Jacobs, Oct 2002-Mar 2003), Sameer Agarwal (UCSD, advisor Serge Belongie, Jan 2003), Srinivasa Narasimhan [former director CMU Robotics Institute] (advisor Shree Nayar, Jan 2003-Jan 2006), Todd Zickler [now chaired professor at Harvard] (Yale, advisor Peter Belhumeur, Nov 2002–Feb 2005), Ira Kemelmacher Shlizerman [now tenured faculty at University of Washington] (Weizmann Institute, advisor Ronen Basri, Jun–Aug 2006), Diego Nehab [now tenured faculty at IMPA] (Princeton, advisor Szymon Rusinkiewicz, Jun 2003-Jun 2007), Pieter Peers [now tenured faculty at College of William and Mary] (KU Leuven, advisor Phil Dutre, Oct-Dec 2005), Oliver Cossairt [NSF Fellow, now tenured faculty at Northwestern] (advisor Shree Nayar, Aug 2007–Jan 2008), Tim Weyrich [now professor at FAU, Erlangen] (Princeton, advisor Szymon Rusinkiewicz, Oct 2007-Jun 2008), Rob Carroll (advisor Maneesh Agrawala, Aug 2010-Jan 2011), Florian Hecht (Sep 2009-Aug 2011), Charles de Rousiers (INRIA, advisor Nicolas Holzschuch, Mar-

Sep 2010), Shuang Zhao [now tenured faculty at UC Irvine] (Cornell, advisor Kavita Bala, Jul 2012-Jun 2014), Wenzel Jakob [winner of 2019 SIGGRAPH Significant New Researcher Award, now faculty at EPFL] (advisor Steve Marschner, Sep 2013-Jan 2014), Jannik Boll-Nielsen (DTU, Aug 2014-Jan 2016), Tzu-Mao Li [winner of 2020 SIGGRAPH Doctoral Dissertation Award, now faculty at UCSD] (MIT, advisor Fredo Durand, Sep 2014-Jun 2017), Jun-Yan Zhu [winner of 2018 SIGGRAPH Doctoral Dissertation Award, now faculty at CMU] (Berkeley, advisor Alyosha Efros, Jan 2016-Jan 2017), Zhengqin Li [winner of 2022 CSE Dissertation award] (UCSD, advisor Manmohan Chandraker, Nov 2016-Dec 2021), Benjamin Mildenhall [winner of 2022 ACM Dissertation Award Honorable Mention, Sakrison memorial prize] (Berkeley, advisor Ren Ng, Sep 2017-Jun 2020), Matthew Tancik [Sakrison memorial prize] (Berkeley, advisor Ren Ng, Sep 2019-Jun 2020), Cheng Zhang [winner of 2023 SIGGRAPH Doctoral Dissertation Award] (UC Irvine, advisor Shuang Zhao, Mar 2019-Jun 2019), Shilin Zhu (advisor Hao Su, Jan 2019-Dec 2021), Xiuming Zhang (MIT, advisor Bill Freeman, Oct 2019-May 2020), Yang Zhou (UC Santa Barbara, advisor LingQi Yan, Oct 2019-present), Rohan Sawhney (CMU, advisor Keenan Crane, Jul 2021-Jun 2022), Stephanie Wang (UCSD, advisor Albert Chern, Oct 2021-Jun 2022), Shlomi Steinberg [now faculty at Waterloo] (UCSB, advisor LingQi Yan, Jul 2022-Jun 2023), Rui Zhu (UCSD, advisor Manmohan Chandraker, Jan 2023–present).

- *M.S.*: Sebastian Enrique [now at Electronic Arts] (Sep 2003–Jun 2005), Kalyan Sunkavalli [researcher at Adobe after Ph.D. at Harvard] (Sep 2004–Jul 2006), Dhruv Mahajan [M.S. thesis, then Ph.D. ] (Sep 2004–Dec 2005), Ryan Overbeck [M.S. thesis, then Ph.D. ] (Sep 2004–Dec 2005), Chien-I Tu [was Ph.D. at Texas A&M] (Jun–Sep 2005), Nandan Dixit [now at Google] (Sep 2005–Dec 2006), Yu-Ting Tseng [now at Google] (Sep 2007–Dec 2008), Eric Risser [now entrepreneur after Ph.D. at Trinity, Dublin] (Sep 2007–Dec 2008), Fu-Chung Huang [now at Apple after Ph.D. at Berkeley] (Jan–Dec 2009), Brandon Wang [Siebel Scholar, now at OpenAI] (M.S., Sep 2012–Jun 2013), Chiwei Tseng [now at DreamWorks] (M.S. thesis, Oct 2014–Jun 2015), Krishna Mullia [now at Adobe] (M.S., Oct 2014–Jun 2015), Jong-Chyi Su [now at NEC after Ph.D. at UMass] (M.S., Oct 2014–Jun 2015), Muhammad Riaz [now at Apple] (M.S., Oct 2014–Aug 2016), Matteo Mannino (M.S., Jan 2015–Jun 2017), Weilun Sun (M.S. Sep 2015–Sep 2017), Jingwen Wang [UCSD CSE MS Research Award 2018, now at Houzz] (M.S. Sep 2016–Jun 2018), Jean Choi [now at Rockstar Games] (M.S. Oct 2017–Jun 2018), Shradha Agarwal [now at Adobe] (M.S. Oct 2017–Jun 2018), Andrew Bauer [now at Disney] (M.S. Jan 2019–Jun 2020), Owen Jow (M.S. Jan 2019–Dec 2020), Guowei Yang [now at Apple] (M.S. Oct 2020–Apr 2022), Yan Xiao [now at Apple] (M.S. Oct 2021–Jun 2023).
- *B.S.*: Makiko Yasui [Theodore Bashkow award] (SEAS 2004), Zeyar Htet (SEAS 2005), Ray Ming-Yeh [Computer Science Scholarship award] (SEAS 2005), Matthew Schulkind (SEAS 2006), Michael Tao (B.S. 2010, continued Ph.D.), Brandon Wang (B.S. 2012, continued M.S.), Nicholas Estorga (B.S. 2013 Dec), Ki-Fung Woody Chow (B.S. 2013 Dec), Ziyang Li (B.S. 2019, now Ph.D. at UPenn), Guangyan Cai [CSE Undergraduate Research Award] (B.S. 2020, now Ph.D. at UC Irvine), Xuezheng Wang (B.S. 2022), Melody Ruth (B.S. 2024).
- *ERSP*: Andrew Oabel, Nabhan Sazzad, Maggie Liu (2021-22); Jade Chng, Kevin Kang, Yuliana Chavez, Justin Bui (2022-23), Taiki Yoshino, David Choi, Hayden Kwok, Rick Rodness (2023-24).
- *High School*: Varun Munagala (2021, Wisconsin Fall 2022), Daniel Guan (2021, MIT Fall 2022).

## **FUNDING (total PI allocation of more than \$12M, of combined funding of more than \$15M)**

“Topology Guidance and Control of Neural Implicit Representations for Inverse Rendering of 3D Shape” [co-PI] with M. Chandraker, NSF \$600,000 Sep 1, 2024–Aug 31, 2027.

“Beyond Pixels: Resolution-Independent and Discontinuity-Preserving Neural Image Representations for Computer Graphics” [PI] with T. Li, NSF \$600,000 Aug 1, 2024-Jul 31, 2027.

“View Synthesis of Large Scale Scenes” [PI] with H. Su, IARPA WRIVA Program \$394,751 Jun 2023–Nov 2024.

“Mobile Capture for Dynamic Scene Reconstruction and Augmented Reality” [PI] Gift from Qualcomm \$37,500, Apr 2024.

UCSD Center Visual Computing memberships Qualcomm, Adobe, Meta \$117,500 2023-24.

“Spatiotemporally Consistent Light Field Estimation” [PI] with M. Chandraker, Rembrand \$75,000 Dec 23.

“Topology Methods for Neural Implicits” [co-PI; students Ishit Mehta, Kunal Gupta] with Manmohan Chandraker, Qualcomm Innovation Fellowship \$100,000, Oct 2023.

“Computer Vision and Image Understanding with Neural Volumetric Representations” [PI] ONR \$555,653

Jul 1, 2023–Jun 30, 2026.

“Dynamic Neural Light Transport Fields for Virtual Reality” [PI] Sony Research Award \$150,000 Sep 1, 2022–Aug 31, 2023.

UCSD Center Visual Computing memberships Qualcomm, Adobe, Google \$125,000 2022-23.

“Dynamic Neural Light Transport Acquisition for Extended Reality” [PI] Qualcomm Gift \$50,000, Apr 2023.

“Neural Materials for Realistic Computer Graphics” [PI] with S. Marschner, N. Snavely, K. Bala (Cornell), NSF \$1,200,000 Aug 1, 2022–Jul 31, 2026.

“Using Captured photos to recover 3D models” Google \$70,000 Nov 21 – present.

Activision Academic Grant [with A. Chern] \$30,000 Nov 2021.

UCSD Center Visual Computing memberships Qualcomm, Facebook, Adobe, Google \$160,000 2021-22.

“Physically-Based Learning for Shape, Lighting and Material in Complex Indoor Scenes” [co-PI] with M. Chandraker, NSF \$500,000 Jul 1, 2021–Jun 30, 2024.

“Differentiable Rendering for Computer Graphics” [PI] with T. Li, F. Durand (MIT), NSF \$1,200,000 Jul 1, 2021–Jun 30, 2025.

“Sparse Multi-View Object Acquisition Using Learned Volumetric Representations” [PI] Amazon Research Award \$80,000, Jun 2021.

“Portrait and General View Synthesis and Reflectance Acquisition” [PI; student Kai-En Lin] Qualcomm FMA \$75,000 Apr 2021–present.

Facebook Distinguished Faculty Award [PI] \$75,000, Oct 2020; \$25,000 Jan 2023.

“Physically-Motivated Deep Inverse Rendering from Sparse Inputs” [PI; students Sai Bi, Zhengqin Li] with Manmohan Chandraker, Qualcomm Innovation Fellowship \$100,000, Oct 2020.

UCSD Center Visual Computing memberships Qualcomm, Kingstar, Adobe, Google \$160,000 2020-21.

“Sparse Multi-View and First Order Computer Vision and Image Understanding” [PI] ONR \$500,000 Jul 1, 2020 – Jun 30, 2023.

“Deep Learning for Physically-Based Rendering on Mobile GPUs” [PI] Samsung GRO \$99,999 Oct 1, 2019 – Oct 31, 2020.

“Single and Group Selfie Video Stabilization” [PI; student fellow Jiyang Yu] Qualcomm FMA \$75,000 Oct 1, 2019 – Jun 30, 2021.

Gift from Shape Inc, [PI] \$20,000 Jul 2019 – present.

UCSD Center Visual Computing, memberships Qualcomm, Facebook, Adobe, Google \$195,000 2019-20.

“Hardware for Light Field and 3D Geometric Learning in Scene Understanding” [PI] with H. Su. ONR \$494,850 Jun 1, 2019 – May 31, 2020.

“Learning-Based 4D Light Field Synthesis from Sparse Images for Virtual Reality” [PI] Google Research Award \$85,000 Apr 2018.

UCSD Center for Visual Computing, membership fees Samsung, Cubic, BASF, Cognex \$220,000 2017-19.

“Coatings Designed for Sensors” [co-PI] with M. Chandraker, BASF \$150,000 Dec 1, 2017 - Sep 30, 2018.

“Scalable Photorealistic Rendering for Augmented Reality on Mobile Devices” [PI] with J. Schulze, Samsung \$350,000 Dec 15, 2017 - Dec 14, 2018.

“Computer Vision and Scene Understanding with Light Field Imaging” [PI] ONR \$500,000 Sep 1, 2017 – Sep 30, 2021.

“Fast Photorealistic Computer Graphics Rendering of Non-Smooth Surfaces” [PI] with S. Marschner (Cornell), NSF \$987,537 Sep 1, 2017–Aug 31, 2021.

“High-Fidelity Shape, Reflectance from Light Field Cameras” [PI] Google Res. Award \$78,500 Apr 2017.

“Detailed Shape and Reflectance Capture with Light Field Cameras” [PI] with S. Rusinkiewicz (Princeton), NSF \$500,000 Sep 1, 2016–Aug 31, 2019.

“Photo-Realistic 3D Face Scan & Rendering” [PI] Qualcomm gift \$50,000, Aug 2016–present.

“Real-Time Photorealistic Rendering for Augmented Reality” [PI] with J. Schulze, Google Virtual Reality Research Award \$100,000 May 2016.

“Unified Multi-Cue 3D Depth Estimation from Light Field Images” [PI] Google Research Award \$74,500 Apr 2016.

“Multi-Scale Reflectance Models” [PI] Autodesk BUILD Grant (gift) \$96,000 Feb 2016.

UC San Diego Center for Visual Computing, membership fees Samsung, Cubic \$130,000 Jan 2016, 2017.



“Unified Multi-Cue Depth Estimation from Sparse Multi-Camera, Dense Light Fields” [PI] Nokia Gift \$48,821 Dec 2015–present.

“Limits and Algorithms for Shape Inference from Multi-View and Multi-Light Light Field Images” [PI] Draper \$60,000 Nov 2015–Jun 2016.

“Geometric 3D Shape, Illumination and Reflectance from RGBD Images and Videos” [PI] Sony \$200,000 Apr 2015–Sep 2017. (Additional \$50,000 gift to VisComp to support Visiting Industrial Fellow Ebi Hiroaki). Licensing fees for CS 184.1x (Queen Rania Foundation) \$49,980 Apr 2015, transferred to UCSD.

“Sampling and Reconstruction for Computer Graphics Rendering and Imaging” [PI] with F. Durand (MIT), \$500,000 Sep 1, 2014–Aug 31, 2017, transferred in full to UCSD.

“Shape Recovery and Image Understanding with non-Lambertian Reflectance” [PI] ONR \$450,000 Jun 2014–May 2017 (transferred to UCSD, Jan 1, 2015–Feb 28, 2018).

“On Relating Visual Elements to City Statistics” [PI] Google Research Award \$71,500 Apr 2014.

“Combining 2D and 3D: Using RGBZ to estimate geometric shape, illumination and reflectance” [PI] Sony \$125,000 Apr 2014–Sep 2015 (returned to Sony after PI’s departure for UCSD).

“Light Field 3D Depth Estimation and Video Stabilization” [PI] Nokia \$100,000 Sep 1, 2013 – Jul 31, 2015.

“Multi-Cue 3D Depth Estimation from Light Field Images” [PI] Samsung GRO grant, \$100,000 Oct 1, 2013

Curriculum Development Grants for CS 184 in 2012-2013: Fung Institute [co-PI] with J. O’Brien \$20,000; UC Berkeley Center for Teaching and Learning Instructional Improvement Grant [PI] \$3,000.

“Sparse Reconstruction and Frequency Analysis for Computer Graphics Rendering and Imaging” [PI] with F. Durand (MIT), \$500,000 Oct 1, 2011 - Sep 30, 2015.

Intel Science and Technology Center for Visual Computing: “Scalable Visual Rendering” and “Semantic Models of Urban Environments”, \$400,000 Apr 2011 – present.

“Beyond Flat Images: Acquiring, Processing and Fabricating Visually Rich Material Appearance” [one of 6 PIs], \$3,000,000 Sep 1, 2010 - Aug 31, 2017 (\$257,000 transferred to UCSD).

“Computational Models of Appearance for Computer Vision and Image Understanding” [PI] ONR PECASE Program, \$1,000,000 Apr 1, 2009 - Mar 31, 2014.

NavTeQ contract, [coPI] with Maneesh Agrawala, \$92,355 Nov 2011 – Jun 2013.

Okawa Foundation Research Grant, \$10,000 Nov 2011 – present.

Gift from Pixar Animation Studios [PI], \$75,000 Mar 1, 2009 – present.

Gift from Intel Corporation [PI], \$15,000 + \$25,000 equipment, Dec 2009 – present.

Gift from Adobe [PI], \$25,000, Mar 2010 – present, \$6,000 May 2011 – present, \$17,700 Dec 2011 – present, \$7,000 Oct 2012 – present, \$40,000 Oct 2013 – present, \$17,000 Oct 2016 – present, \$24,000 Oct 2017 – present, \$42,500 Oct 2018 – present, \$35,000 Oct 2019 – present, \$37,500 Oct 2020 –present, \$48,000 Oct 2021 –present, \$20,000 Oct 22 –present, \$50,000 Oct 23 –present.

Gift from NVIDIA [PI], \$10,000 + equipment, Mar 2010 – present.

“Theory and Algorithms for High Quality Real-Time Rendering and Lighting/Material Design in Computer Graphics” [PI] with H. Jensen (UCSD), NSF CPA \$320,000 Sep 1, 2007 - Aug 31, 2010.

“Mathematical Models of Illumination and Reflectance for Image Understanding and Machine Vision” [PI], ONR Young Investigator Program \$350,000 + \$30,000 matching funds Jun 1, 2007 - May 31, 2010.

Gift from Adobe Research [PI], \$68,000 Oct 1, 2007 – present.

“Fast and Accurate Volumetric Rendering of Scattering Phenomena in Computer Graphics” [co-PI] with S. Nayar, S. Narasimhan (CMU, PI), NSF CPA \$400,000 Mar 1, 2006 - Feb 28, 2010.

“Sloan Fellowship in Computer Science”, Alfred P. Sloan Foundation \$45,000 Sep 1, 2005 - Aug 31, 2009.

“CAREER: Mathematical and Computational Fundamentals of Visual Appearance for Computer Graphics” [PI], NSF CCF Graphics and Visualization \$425,000 +\$45,000 matching funds Feb 1, 2005 - Jan 31, 2011.

“Restore the Trustworthiness of Digital Photographs: Blind Detection of Digital Photograph Tampering” [co-PI] with S. Chang [PI], NSF Cyber Trust program, \$740,000 Sep 1, 2004 - Aug 31, 2008.

“Real-Time Rendering and Interaction with Complex Illumination and Materials” [PI], Intel Corporation AIM Program, \$75000 + \$15000 equipment, Dec 1, 2003 – Aug 2009.

“Real-Time Visualization and Rendering of Complex Scenes” [PI] with H. Jensen (UCSD), NSF program on Numeric, Symbolic and Geometric Computation CCF \$434,734 Dec 15, 2003 - Nov 30, 2007.

“An Electronic Field Guide: Plant Exploration and Discovery in the 21st Century” [co-PI] with P. Belhumeur [PI], S. Feiner, D. Jacobs (UMD), J. Kress (Smithsonian), NSF ITR \$2,224,000 Sep 1, 2003 - Aug 31, 2010.

## PROFESSIONAL SERVICE

Area Chair, IEEE CVPR 2019, ICCV 2021, ECCV 2022, CVPR 2023, 2024  
Co-Chair, International Conference on Computational Photography, 2018; best paper committee 2019.  
Co-Chair, Eurographics Symposium on Rendering, 2011. *Given Eurographics Recognition of Service Award*  
Associate Editor, ACM Transactions on Graphics, 2006 – 2016  
Associate Editor, IEEE Transactions on Pattern Analysis and Machine Intelligence, 2009 – 2013  
IEEE-CS Fellows Evaluation Committee, 2017, 2018, 2020  
ACM SIGGRAPH Doctoral Dissertation Awards Committee, 2017, 2018  
NSF Panelist and Reviewer, 2005 - 2016  
Proposal Reviewer for Austrian, Cyprus, Science Foundation, KAUST, 2005, 2006, 2010, 2015  
Program Committee and Papers Sort, SIGGRAPH ASIA conference, 2009-10, 2014, 2016-17, 2019-20, 2023  
Posters and Technical Briefs Committee, SIGGRAPH ASIA conference, 2013  
Program Committee, SIGGRAPH conference, 2006, 2007, 2024; papers sort 2020  
Program Committee, EGSR (Eurographics Symposium on Rendering), 2005, 2006, 2007, 2009, 2012, 2013  
Program Committee, HPG (High-Performance Graphics), 2023  
Program Committee, CVPR (Conf, on Computer Vision and Pattern Recognition), 2003,07,10,2016-17, 21  
Program Committee, ICCV (International Conference on Computer Vision), 2003, 2009  
Program Committee, ECCV (European Conference on Computer Vision), 2004, 2006, 2020  
Program Committee, ACCV (Asian Conference on Computer Vision), 2006  
Frontiers of Science Graphics Awards Committee, 2024  
Reviewer for SIGGRAPH, Eurographics, Eurographics Symposium on Rendering, IEEE Computer Graphics and Applications, IEEE TVCG, IEEE PAMI, Computer Vision and Image Understanding, . . .

## DEPARTMENTAL AND UNIVERSITY SERVICE

- *Vice-Chair for Academic Personnel:* CSE Department Vice-Chair Jul 2016–Jun 2019, co-Vice Chair Jun 2022–Jun 2024 for academic personnel merits/promotions. Regular consultations with department chair, CSE and Dean’s AP staff.
- *Limited Submissions Committee, Science and Engineering:* Responsible for deciding UCSD nominees for limited submissions competitions (Jul 2019–present).
- *Nominations Committee:* Responsible for nominating CSE Faculty for Awards (Jul 2019–Jun 2022, chair Apr 2021–Jun 2022).
- *ESR Financial System Review Committee/Panorama User Group* Consulted on many issues involving new financial system, Jun 2020–present.
- *Committee on Reviewing Vendors for Academic Personnel:* (UCSD, 2020-21).
- *Senate Committee on Research:* (UCSD Jul 2022–present).
- *Senate Committee on Research Grants, General Campus:* Engineering representative on academic senate committee for internal university senate research and bridge grants (Jul 2016–Jun 2019).
- *Search Committee, Director for Online Education:* (UCSD, 2017).
- *Liaison for UCSD-edX:* Leading role in facilitating UCSD-edX agreement for offering of open online courses. Meetings with deans, academic senate, associate vice-chancellor, edX CEO. Agreement was signed by executive vice-chancellor in Apr 2015 with my CSE 167x as first UC San DiegoX course Aug 2015. UCSD-edX agreement covered in news article in This Week @UC San Diego. UCSD now has several edX courses including micromasters and first professional certificate in virtual reality.
- *GCCP-UCRP Bug Resolution:* Noticed and followed up to resolve key bug in UCRP retirement credit for GCCP participants at UCSD (and other UCs). Discussions with dean, heads of UCSD payroll, head of academic compensation, director of UCOP retirement. New NSTP title codes introduced Jul 2015 for 15-16 academic year, and retroactive correction of UCRP credit completed Oct 2015. I noticed that the problem had resurfaced in Aug 2020 with the UC Path Transition, and contacted the new director of UCOP retirement calculations. A retroactive fix was applied end of Aug 2020 restoring full UCRP credit for GCCP participants at all UC campuses.

- **UC Path Transition:** Played important self-directed role in noticing and following up to fix many issues in UC Path and Oracle transition, some impacting faculty UC-wide, from Mar 2020–Jun 2021. This includes the GCCP/UCRP bug above, incorrect summer salary DC plan contributions, incorrect tax reporting etc.
- **Director, UC San Diego Center for Visual Computing:** (Apr 2015–present). Managing relationships with faculty, industrial partners, organizing events including first annual retreat with 9 industrial sponsors at La Jolla Shores Hotel May 20-21, 2016. Next retreats with 45 participants at La Jolla Shores Hotel on May 25-26, 2017 and 60 participants Jun 7-8, 2018; May 30-31, 2019; virtual retreat with 65+ participants Jun 2, 2021, return to in person Jun 9, 2022 with 100+ registrations. Overall leadership, and speaking at key events, including keynote at Corporate Affiliates program dinner, Jacobs Research Expo 2015, and presentation to UCSD Foundation and Alumni Board.
- **Distinguished Lecture Series:** Organized list of speakers and CSE 292 course for Fall 2014 DLS.
- **Faculty Recruiting Committee:** CSE Faculty Recruiting 2014-2015; 2018-19. Reviewing about 100 applicants in vision/graphics/robotics and overall shortlist, making recommendations for interview and comments on candidate talks and interviews.
- **PhD Admissions Committee:** CSE PhD admissions committee 2014-2015. Reviewing 50+ applicants, recommending admission and attending admissions meetings. Organized vision/graphics visit day, involving scheduling, and meetings with 8-10 admitted Ph.D. students, each year 2015–present.

## DIVERSITY AND OUTREACH

Online graphics course CSE 167x draws a very diverse audience worldwide across many ethnic groups and socioeconomic backgrounds, many of whom would otherwise have no access to computing education. Community TAs and others come from Australia, Turkey, Russia, Argentina and include shopkeepers without any formal degrees, high school students, and engineers/managers without formal computer science training. More than 100,000 registrations to date, and many students have also used the course to obtain positions in the graphics industry, and maintain their education during COVID-19 lockdowns.

As Director for the Center of Visual Computing, led conversation on Visual Computing for a program on UCSD-TV in the Computing Primetime Series (premiere 8/24/2015). 400,000+ views online, drawing broad general audience into computing, <http://ucsd.tv/search-details.aspx?showID=29675>.

Interview on Waskul TV: advances in interactive rendering to a general audience Jul 2013, 20,000+ views.

## CONSULTING AND INDUSTRIAL EMPLOYMENT

- **DEC Systems Research Center:** Intern 6-9/1999, Consultant 9/1999-8/2000. Publication on soft shadows related to image-based rendering and image compositing [3].
- **Pixar Animation Studios:** 3/2009-12/2011: Spherical Harmonic Lighting, Importance Sampling, Efficient Visibility. Adoption in Renderman 16 and publications [40,119,120].
- **Lytro:** 3/2012-4/2013: Analysis of Light Field Camera Resolution [50].
- **Pelican Imaging:** 5/2013-6/2014, on Technical Advisory Board till 6/2015: US Patents 10089740 (approved 10/2018), 10574905 (approved Feb 2020) “System and Methods for Depth Regularization and Semiautomatic Interactive Matting Using RGB-D Images” by M. Srikanth, **R. Ramamoorthi**, K. Venkataraman, P. Chatterjee.
- **KL Gates:** 5/2014: Legal expert declaration in patent involving stereo imaging.
- **Light:** 7/2015–3/2016: Occasional consulting on computational imaging and 3D reconstruction.
- **Proprio Vision:** 9/2020–4/2022: Member of Technical Advisory Board.
- **NVIDIA:** 1/2021–4/2022: Rendering Research Consultant; 4/2022–present: Distinguished Research Scientist, Graphics (part-time) [92,93,95,99,102,147,216].

## PUBLICATIONS

### SIGGRAPH AND TOG<sup>1</sup>

1. “Fast Construction of Accurate Quaternion Splines” by **R. Ramamoorthi** and A. Barr. *In proceedings of SIGGRAPH 1997*, pages 287–292.
2. “Creating Generative Models from Range Images” by **R. Ramamoorthi** and J. Arvo. *In proceedings of SIGGRAPH 1999*, pages 195–204.
3. “Efficient Image-Based Methods for Rendering Soft Shadows” by M. Agrawala, **R. Ramamoorthi**, A. Heirich and L. Moll. *In proceedings of SIGGRAPH 2000*, pages 375–384.
4. “A Signal-Processing Framework for Inverse Rendering” by **R. Ramamoorthi** and P. Hanrahan. *In proceedings of SIGGRAPH 2001*, pages 117–128. **Included in Seminal Graphics Papers volume 2, 2023.**
5. “An Efficient Representation for Irradiance Environment Maps” by **R. Ramamoorthi** and P. Hanrahan. *In proceedings of SIGGRAPH 2001*, pages 497–500.
6. “Frequency Space Environment Map Rendering” by **R. Ramamoorthi** and P. Hanrahan. *ACM Transactions on Graphics 21(3) [SIGGRAPH 2002]*, pages 517–526.
7. “All-Frequency Shadows Using Non-Linear Wavelet Lighting Approximation” by R. Ng, **R. Ramamoorthi** and P. Hanrahan. *ACM Transactions on Graphics 22(3) [SIGGRAPH 2003]*, pages 376–381.
8. “Structured Importance Sampling of Environment Maps” by S. Agarwal, **R. Ramamoorthi**, S. Belongie and H. Jensen. *ACM Transactions on Graphics 22(3) [SIGGRAPH 2003]*, pages 605–612.
9. “Triple Product Wavelet Integrals for All-Frequency Relighting” by R. Ng, **R. Ramamoorthi** and P. Hanrahan. *ACM Transactions on Graphics 23(3) [SIGGRAPH 2004]*, pages 477–487.
10. “Efficient BRDF Importance Sampling Using a Factored Representation” by J. Lawrence, S. Rusinkiewicz and **R. Ramamoorthi**. *ACM Transactions on Graphics 23(3) [SIGGRAPH 2004]*, pages 494–503.
11. “A Signal-Processing Framework for Reflection” by **R. Ramamoorthi** and P. Hanrahan. *ACM Transactions on Graphics, 23(4)*, pages 1004–1042, Oct 2004.
12. “Efficiently Combining Positions and Normals for Precise 3D Geometry” by D. Nehab, S. Rusinkiewicz, J. Davis and **R. Ramamoorthi**. *ACM Transactions on Graphics 24(3) [SIGGRAPH 2005]*, pages 536–543.
13. “A Practical Analytic Single Scattering Model for Real-Time Rendering” by B. Sun, **R. Ramamoorthi**, S. Narasimhan and S. Nayar. *ACM Transactions on Graphics 24(3) [SIGGRAPH 2005]*, pages 1040–1049.
14. “Inverse Shade Trees for Non-Parametric Material Representation and Editing” by J. Lawrence, A. Ben-Artzi, C. Decoro, W. Matusik, H. Pfister, **R. Ramamoorthi** and S. Rusinkiewicz. *ACM Transactions on Graphics 25(3) [SIGGRAPH 2006]*, pages 735–745.
15. “A Compact Factored Representation of Heterogeneous Subsurface Scattering” by P. Peers, K. von Berge, W. Matusik, **R. Ramamoorthi**, J. Lawrence, S. Rusinkiewicz and P. Dutre. *ACM Transactions on Graphics 25(3) [SIGGRAPH 2006]*, pages 746–753.
16. “Time-Varying Surface Appearance: Acquisition, Modeling and Rendering” by J. Gu, C. Tu, **R. Ramamoorthi**, P. Belhumeur, W. Matusik and S. Nayar. *ACM Transactions on Graphics 25(3) [SIGGRAPH 2006]*, pages 762–771.
17. “Real-Time BRDF Editing in Complex Lighting” by A. Ben-Artzi, R. Overbeck and **R. Ramamoorthi**. *ACM Transactions on Graphics 25(3) [SIGGRAPH 2006]*, pages 945–954.
18. “Acquiring Scattering Properties of Participating Media by Dilution” by S. Narasimhan, M. Gupta, C. Donner, **R. Ramamoorthi**, S. Nayar and H. Jensen. *ACM Transactions on Graphics 25(3) [SIGGRAPH 2006]*, pages 1003–1012.
19. “A First Order Analysis of Lighting, Shading, and Shadows” by **R. Ramamoorthi**, D. Mahajan and P.

<sup>1</sup>The ACM SIGGRAPH conference (and since 2008, SIGGRAPH Asia) is the leading venue for publishing research in computer graphics, with acceptance rates ranging from 20% – 35%. Since 2002, the proceedings have also been published as a special issue of the ACM Transactions on Graphics (TOG), the leading journal in graphics. Moreover since 2008, regular TOG papers are also presented at SIGGRAPH, further blurring the distinction. The EuroGraphics Symposium on Rendering (EGSR) is the leading venue for rendering research (second only to the SIGGRAPH conference), and has a competitive acceptance rate of 30 – 40%. Since 2008, many papers also appear in a special Computer Graphics Forum journal issue. Both SIGGRAPH and EGSR papers are fully reviewed, and considered terminal publications. In computer vision, the leading journals are the IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), and the International Journal of Computer Vision (IJCV). Leading conferences are IEEE CVPR, ICCV and ECCV. Papers in these conferences are rigorously reviewed, with acceptance rates around 25%, and currently well below 3% for oral presentations. Note that since 2022, SIGGRAPH (Asia) has also introduced a conference-only track (as was the case for all papers 2001 and earlier); those papers are also included above.

- Belhumeur. *ACM Transactions on Graphics*, 26(1), Article 2, 2:1–2:21, Jan 2007.
20. “Frequency Domain Normal Map Filtering” by C. Han, B. Sun, **R. Ramamoorthi** and E. Grinspun. *ACM Transactions on Graphics* 26(3) [SIGGRAPH 2007], article 28, 28:1–28:11.
  21. “A Theory of Locally Low Dimensional Light Transport” by D. Mahajan, I. Kemelmacher Shlizerman, **R. Ramamoorthi** and P. Belhumeur. *ACM Transactions on Graphics* 26(3) [SIGGRAPH 2007], article 62, 62:1–62:9.
  22. “A Precomputed Polynomial Representation for Interactive BRDF Editing with Global Illumination” by A. Ben-Artzi, K. Egan, **R. Ramamoorthi** and F. Durand. *ACM Transactions on Graphics* 27(2), Article 13, 13:1–13:13, Apr 2008. Presented at SIGGRAPH 2008 TOG papers session on Rendering Materials.
  23. “Multiscale Texture Synthesis” by C. Han, E. Risser, **R. Ramamoorthi** and E. Grinspun. *ACM Transactions on Graphics*, 27(3) [SIGGRAPH 2008], article 51, 51:1–51:8.
  24. “Light Field Transfer: Global Illumination Between Real and Synthetic Objects” by O. Cossairt, S. Nayar and **R. Ramamoorthi**. *ACM Transactions on Graphics*, 27(3) [SIGGRAPH 2008], article 57, 57:1–57:6.
  25. “A Layered, Heterogeneous Reflectance Model for Acquiring and Rendering Human Skin” by C. Donner, T. Weyrich, E. D’Eon, **R. Ramamoorthi** and S. Rusinkiewicz. *ACM Transactions on Graphics*, 27(5) [SIGGRAPH Asia 2008], article 140, 140:1–140:12. **Front Cover Image of Inaugural SIGGRAPH Asia.**
  26. “Compressive Light Transport Sensing” by P. Peers, D. Mahajan, B. Lamond, A. Ghosh, W. Matusik, **R. Ramamoorthi** and P. Debevec. *ACM Transactions on Graphics* 28(1), Article 3, 3:1–3:18, Jan 2009. Presented at SIGGRAPH 2009.
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