Ayush Tewari

Postdoctoral Researcher

✉ *ayusht@mit.edu*
ayushtewari.github.io

Education

10/2016 – 07/2021 **Max Planck Institute for Informatics and Saarland University**, Saarbrücken, Germany.
Doctor of Engineering (Dr.-Ing.)
Thesis: "Self-Supervised Reconstruction and Synthesis of Faces"
Supervisor: Prof. Christian Theobalt

08/2014 – 07/2015 **Grenoble Institute of Technology**, Grenoble, France.
Master of Science in Computer Science
Thesis: "Image Blending using Local Phase"
Supervisors: Dr. George Drettakis and Dr. Adrien Bousseau

06/2010 – 05/2014 **International Institute of Information Techonology**, Hyderabad, India.
Bachelor of Technology (Honours) in Computer Science

Positions

12/2021 – present **MIT**.
Postdoctoral Researcher with Prof. William T. Freeman and Prof. Josh Tenenbaum

08/2021 – 12/2021 **Max Planck Institute for Informatics**.
Postdoctoral Researcher with Prof. Christian Theobalt

03/2020 – 08/2020 **Stanford University**.
Research Intern with Prof. Maneesh Agrawala

06/2016 – 09/2016 **Max Planck Institute for Informatics**.
Research Intern with Prof. Christian Theobalt

02/2015 – 07/2015 **GRAPHDECO team, INRIA Sophia-Antipolis**.
Research Intern with Dr. George Drettakis and Dr. Adrien Bousseau

05/2013 – 07/2013 **Siemens Technology and Services Private Limited, Bangalore**.
Research Intern

Teaching

Teaching Assistant **Max Planck Institute for Informatics**, Saarbrücken, Germany.
Seminars:
- 3D Shape Analysis (Summer 2018)
- Computer Vision for Computer Graphics (Summer 2017, Summer 2019, Summer 2021)

Teaching Assistant **International Institute of Information Technology**, Hyderabad, India.
Courses:
- Digital Signals Analysis and Applications (Spring 2013)
- Mathematics I (Discrete Mathematics) (Fall 2012, Fall 2013)

Advised Theses

Master Theses **Max Planck Institute for Informatics**, Saarbrücken, Germany.

- "Weakly-supervised Surface Reconstruction Using Floating Radial Basis Functions" Hossein Hajipour (2018)
- "Combined 3D Eye and Face Reconstruction using Monocular RGB Images " Chitra Singh (2019)
- "i3DMM: Deep Implicit Morphable 3D Head Model " Tarun Yenamandra (2020)
- "Deep Irradiance Volume for Relighting" Tianqi Fan (2020)

Academic Services

Reviewing.

- The IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
- ACM Transactions on Graphics (TOG)
- International Journal of Computer Vision (IJCV)
- The IEEE International Conference on Computer Vision (ICCV)
- IEEE Conference on Computer Vision and Pattern Recognition (CVPR)
- SIGGRAPH, SIGGRAPH Asia
- Conference of the European Association for Computer Graphics (Eurographics)
- Conference on Neural Information Processing Systems (NeurIPS)
- International Conference on Machine Learning (ICML)
- European Conference on Computer Vision (ECCV)
- British Machine Vision Conference (BMVC)

Organizing.

- SIGGRAPH Course on Advances in Neural Rendering (2021)
- CVPR Tutorial on Neural Rendering (2020)

Talks

08/2021 **Synthesis of Portrait Images with 3D Control**.
AIT Lab, ETH
Adobe Research

08/2021 **GANs with 3D Control**.
SIGGRAPH Course on Advances in Neural Rendering 2021

07/2021 **Self-Supervised Reconstruction and Synthesis of Faces**.
Max Planck Institute for Informatics

06/2021 **Synthesis of Portrait Images with 3D Control**.
CVPR NTIRE Workshop 2021

03/2021 **Self-Supervised 3D Digitization of Faces**.
MIT Vision and Graphics Seminar

12/2020 **PIE: Portrait Image Embedding for Semantic Control**.
SIGGRAPH Asia 2020, Virtual

06/2020 **StyleRig: Rigging StyleGAN for 3D Control over Portrait Images**.
CVPR 2020, Virtual

06/2020 **Neural Rendering Fundamentals**.
CVPR 2020, Virtual

05/2020 **Neural Rendering Fundamentals**.
Eurographics 2020, Virtual

06/2019 **FML: Face Model Learning from Videos**.
CVPR 2019, Long Beach, USA

06/2019 **Reconstructing and Editing Faces in the Wild**.
TU Münich

04/2019 **Building 3D Morphable Face Models from 2D Data**.
Dagstuhl Semimar on 3D Morphable Models

03/2019 **Reconstructing and Editing Faces in the Wild**.
Google, San Fransisco

06/2018 **Self-supervised Multi-level Face Model Learning for Monocular Reconstruction at over 250 Hz**.
CVPR 2018, Salt Lake City, USA

10/2017 **MoFA: Model-based Deep Convolutional Face Autoencoder for Unsupervised Monocular Reconstruction**.
ICCV 2017, Venice, Italy
Workshop on Image-based Modeling of Articulated and Deformable Objects, ICCV 2017, Venice, Italy

Publications

[1] Gereon Fox, **Tewari, Ayush**, Mohamed Elgharib, and Christian Theobalt. StyleVideoGAN: A Temporal Generative Model using a Pretrained Stylegan. In *The British Machine Vision Conference (BMVC), (Oral Presentation)*, 2021.

[2] Linjie Lyu, Marc Habermann, Lingjie Liu, Mallikarjun B R, **Ayush Tewari**, and Christian Theobalt. Efficient and differentiable shadow computation for inverse problems. In *IEEE International Conference on Computer Vision (ICCV)*, 2021.

[3] Edgar Tretschk, **Ayush Tewari**, Vladislav Golyanik, Michael Zollhöfer, Christoph Lassner, and Christian Theobalt. Non-rigid neural radiance fields: Reconstruction and novel view synthesis of a dynamic scene from monocular video. In *IEEE International Conference on Computer Vision (ICCV)*, 2021.

[4] Mallikarjun B R, **Ayush Tewari**, Abdallah Dib, Tim Weyrich, Bernd Bickel, Hans-Peter Seidel, Hanspeter Pfister, Wojciech Matusik, Louis Chevallier, Mohamed Elgharib, and Christian Theobalt. PhotoApp: Photorealistic appearance editing of head portraits. In *ACM Transactions on Graphics (Proceedings SIGGRAPH)*, 2021a.

[5] Tarun Yenamandra, **Ayush Tewari**, Florian Bernard, Hans-Peter Seidel, Mohamed Elgharib, Daniel Cremers, and Christian Theobalt. i3DMM: Deep implicit 3d morphable model of human heads. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR) (Oral Presentation)*, 2021.

[6] Mallikarjun B R, **Ayush Tewari**, Tae-Hyun Oh, Tim Weyrich, Bernd Bickel, Hans-Peter Seidel, Hanspeter Pfister, Wojciech Matusik, Mohamed Elgharib, and Christian Theobalt. Monocular reconstruction of neural face reflectance fields. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021b.

[7] Mallikarjun B R, **Ayush Tewari**, Hans-Peter Seidel, Mohamed Elgharib, and Christian Theobalt. Learning complete 3d morphable face models from images and videos. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021c.

[8] Yuxiao Zhou, Marc Habermann, Ikhsanul Habibie, **Ayush Tewari**, Christian Theobalt, and Feng Xu. Monocular real-time full body capture with inter-part correlations. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021.

[9] **Ayush Tewari**, Mohamed Elgharib, Mallikarjun BR, Florian Bernard, Hans-Peter Seidel, Patrick Pérez, Michael Zöllhofer, and Christian Theobalt. PIE: Portrait Image Embedding for Semantic Control. *ACM Transactions on Graphics (Proceedings SIGGRAPH Asia)*, 2020a.

[10] Mohamed Elgharib, Mohit Mendiratta, Justus Thies, Matthias Nießner, Hans-Peter Seidel, **Ayush Tewari**, Vladislav Golyanik, and Christian Theobalt. Egocentric Videoconferencing. *ACM Transactions on Graphics (Proceedings SIGGRAPH Asia)*, 39(6), Dec 2020.

[11] **A. Tewari**, O. Fried, J. Thies, V. Sitzmann, S. Lombardi, K. Sunkavalli, R. Martin-Brualla, T. Simon, J. Saragih, M. Nießner, R. Pandey, S. Fanello, G. Wetzstein, J.-Y. Zhu, C. Theobalt, M. Agrawala, E. Shechtman, D. B Goldman, and M. Zollhöfer. State of the Art on Neural Rendering. *Computer Graphics Forum (EG STAR 2020)*, 2020b.

[12] **Ayush Tewari**, Mohamed Elgharib, Gaurav Bharaj, Florian Bernard, Hans-Peter Seidel, Patrick Pérez, Michael Zöllhofer, and Christian Theobalt. StyleRig: Rigging StyleGAN for 3D Control over Portrait Images, CVPR

2020. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR) (Oral Presentation)*, june 2020c.

[13] Justus Thies, Mohamed Elgharib, **Ayush Tewari**, Christian Theobalt, and Matthias Nießner. Neural Voice Puppetry: Audio-driven Facial Reenactment. *European Conference on Computer Vision (ECCV)*, 2020.

[14] Edgar Tretschk, **Ayush Tewari**, Vladislav Golyanik, Michael Zollhöfer, Carsten Stoll, and Christian Theobalt. PatchNets: Patch-Based Generalizable Deep Implicit 3D Shape Representations. *European Conference on Computer Vision (ECCV)*, 2020a.

[15] Edgar Tretschk, **Ayush Tewari**, Michael Zollhöfer, Vladislav Golyanik, and Christian Theobalt. DEMEA: Deep Mesh Autoencoders for Non-Rigidly Deforming Objects. *European Conference on Computer Vision (ECCV) (Oral Presentation)*, 2020b.

[16] Bernhard Egger, William A. P. Smith, **Ayush Tewari**, Stefanie Wuhrer, Michael Zollhoefer, Thabo Beeler, Florian Bernard, Timo Bolkart, Adam Kortylewski, Sami Romdhani, Christian Theobalt, Volker Blanz, and Thomas Vetter. 3D Morphable Face Models - Past, Present and Future. *ACM Transactions on Graphics*, 39(5), August 2020.

[17] **Ayush Tewari**, Michael Zollhöfer, Florian Bernard, Pablo Garrido, Hyeongwoo Kim, Patrick Pérez, and Christian Theobalt. High-fidelity monocular face reconstruction based on an unsupervised model-based face autoencoder. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 42(2):357–370, 2020d.

[18] Ohad Fried, **Ayush Tewari**, Michael Zollhöfer, Adam Finkelstein, Eli Shechtman, Dan B Goldman, Kyle Genova, Zeyu Jin, Christian Theobalt, and Maneesh Agrawala. Text-based Editing of Talking-head Video. *ACM Trans. Graph.*, 38(4):68:1–68:14, July 2019.

[19] **Ayush Tewari**, Florian Bernard, Pablo Garrido, Gaurav Bharaj, Mohamed Elgharib, Hans-Peter Seidel, Patrick Pérez, Michael Zollhöfer, and Christian Theobalt. FML: Face Model Learning from Videos. In *The IEEE Conference on Computer Vision and Pattern Recognition (CVPR) (Oral Presentation)*, 2019.

[20] Qianru Sun, **Ayush Tewari**, Weipeng Xu, Mario Fritz, Christian Theobalt, and Bernt Schiele. A Hybrid Model for Identity Obfuscation by Face Replacement. In *European Conference on Computer Vision (ECCV)*, 2018.

[21] Hyeongwoo Kim, Pablo Garrido, **Ayush Tewari**, Weipeng Xu, Justus Thies, Matthias Nießner, Patrick Pérez, Christian Richardt, Michael Zollöfer, and Christian Theobalt. Deep Video Portraits. *ACM Transactions on Graphics (TOG)*, 37(4):163, 2018a.

[22] **Ayush Tewari**, Michael Zollhöfer, Pablo Garrido, Florian Bernard, Hyeongwoo Kim, Patrick Pérez, and Christian Theobalt. Self-supervised Multi-level Face Model Learning for Monocular Reconstruction at over 250 Hz. In *The IEEE Conference on Computer Vision and Pattern Recognition (CVPR) (Oral Presentation)*, 2018.

[23] Hyeongwoo Kim, Michael Zollöfer, **Ayush Tewari**, Justus Thies, Christian Richardt, and Theobalt Christian. InverseFaceNet: Deep Single-Shot Inverse Face Rendering From A Single Image. In *The IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2018b.

[24] **Ayush Tewari**, Michael Zollöfer, Hyeongwoo Kim, Pablo Garrido, Florian Bernard, Patrick Perez, and Theobalt Christian. MoFA: Model-based Deep Convolutional Face Autoencoder for Unsupervised Monocular Reconstruction. In *The IEEE International Conference on Computer Vision (ICCV) (Oral Presentation)*, 2017.