# Balamurugan Thambiraja

*Curriculum Vitae*

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## Research Interests

I am interested in leveraging foundational models for synthesizing human motion and its underlying dynamics. Recently, I have been working with diffusion models and large language models for motion synthesis and editing, aiming to enhance the realism, controllability and generalization to in-the-wild scenarios.

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## Education

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| May 2024-Present | **Ph.D. Student**, *Technical University of Darmstadt*, Germany. Continuing my Ph.D. with Prof. Dr. Justus Thies at 3D Graphics & Vision, focusing on foundational models for motion synthesis. |
| Aug 2021- May 2024 | **Ph.D. Student**, *Max-Planck Institute for Intelligent Systems*, Tuebingen, Germany. Presently pursuing a Ph.D. with Prof. Dr. Justus Thies at Neural Capture and Synthesis group, MPI-IS focusing on 3D facial animation synthesis and editing. |
| October 2017- March 2021 | **Master of Science, Informatics**, *Technical University of Munich*, Germany. Worked with Prof. Dr. Matthias Nießner at Visual Computing Group at TUM focusing on human modelling and motion synthesis. |
| 2011-2015 | **Bachelor of Engineering, Electrical and Electronics**, *Kumaraguru College of Technology*, Coimbatore, India. |

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## Experience

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| July, 2025 – Present | **Guest Scientist**, *Perceiving systems group, Max-Planck Institute for Intelligent Systems*, Tuebingen, Germany. Working on foundational models for human motion synthesis. |
| Sept,2024 – May, 2025 | **Applied Scientist Intern**, *Amazon*, Sunnyvale, USA. Worked on generative AI for human motion synthesis. |
| May-August, 2021 | **Deep Learning Intern**, *Presize GmbH(now Meta)*, Munich, Germany. Worked on developing a online real-time virtual try-on system. Designed and developed a novel FLOW-based virtual try-on method. |
| Oct, 2019 – June,2020 | **AI/CV Student Researcher**, *Osram Automotive*, Munich, Germany. Worked on real-time head pose and eye gaze estimation for driver awareness monitoring system. Contributed to development of the eye gaze tracking solution that can run real-time on edge-computing devices. |

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## Publications

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| Under review | **Thambiraja, B.**, Taheri, O., Danecek, R., Becherini, G., Pons-Moll, G. and Thies, J., CLUTCH: Contextualized Language Model For Unlocking Text-Conditioned Hand Motion Modelling in the wild. [webpage] |

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| 3DV2025 | **Thambiraja, B.**, Prinzler, M., Aliakbarian, S., Cosker, D. and Thies, J., 3DiFACE: Synthesizing and Editing Holistic 3D Facial Animation. [webpage] |
| ICCV23 | **Thambiraja, B.**, Habibie, I., Aliakbarian, S., Cosker, D., Theobalt, C. and Thies, J., 2023. Imitator: Personalized Speech-driven 3D Facial Animation. [webpage] |

## Academic Projects

**2021**   **Neural Sign Language Synthesis** - Master Thesis [pdf]

Developed a method to synthesize sign pose sequences(facial and hand-gestures) from input text using a novel transformer-based method. Achieved state-of-the-results in RWTH-PHOENIX 2014T benchmark by utilizing relative positional embedding and relative discriminator.

**2020**   **Human Model Learning from RGB with Depth Assistance** [pdf]

Developed a self-supervised learning approach to learn clothed human model from RGB-D sequence. Proposed a novel method to generate robust 3D supervision data in the form of depth silhouettes.

## Achievements

**2023**   **Best Lighting Talk award** in the International Max Planck Research School (IMPRS) for Intelligent Systems (IS), Boot-Camp 2023.

**2023**   Carl-Zeiss Stifung award in the inaugural Cyber-Valley Incubator program, 2023.

## Skills

Technical   Python, C++, CUDA, MATLAB, Blender, Pytorch, Numpy, Machine Learning, Deep learning for Character animation

Languages   Tamil(Native), English(C2), German(A2).

## References

- Prof. Justus Thies, 3D Graphics & Vision Lab, Technical University of Darmstadt.
- Dr. Darren Cosker, Principal scientist, Mesh Labs, Microsoft, Cambridge, UK.
- Dr. Sadegh Aliakbarian, Senior Research scientist, Mesh Labs, Microsoft, Cambridge, UK.