Hossain Muhammad Muctadir, MSc. EngD.

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Education

2020 – 2025 **Doctor of Philosophy (PhD)** in Model-Based Software Engineering
Eindhoven University of Technology, The Netherlands.
Topic: *Consistency management of Digital Twin models.*
**planned defense October 2025*

2018 – 2020 **Engineering Doctorate (EngD)** in Software Technology
Eindhoven University of Technology, The Netherlands.
Thesis title: *Model as a Service : Towards a Discovery Platform for Internet of Food.*
Conducted in collaboration with Unilever R&D, Wageningen, The Netherlands

2014 – 2017 **Masters** in Software Systems Engineering
RWTH Aachen University, Germany.
Thesis title: *Similarity analysis framework for Software Product Line extraction.*
Conducted in collaboration with FEV GmbH, Alsdorf, Germany

2009 – 2013 **Bachelors** in Information Technology (major in Software Engineering)
Institute of Information Technology, University of Dhaka, Bangladesh
Thesis title: *Chest x-ray analysis to detect abnormal mass tissue in lung.*

Research Publications

1. **Muctadir**, **H. M.**, Kamburjan, E., Cleophas, L., & van den Brand, M. (2025). *A consistency management framework for digital twin models* [Preprint submitted to JSS].
https://doi.org/10.2139/ssrn.5105174

2. **Muctadir**, **H. M.**, Pfeiffer, J., Houdijk, J., Cleophas, L., & Wortmann, A. A taxonomy of change types for textual dsl grammars. In: In *Proceedings of the 13th international conference on model-based software and systems engineering - modelsward*. INSTICC. SciTePress, 2025, 169–176. ISBN: 978-989-758-729-0.
https://doi.org/10.5220/0013127800003896

3. **Muctadir**, **H. M.**, Cleophas, L., & van den Brand, M. (2024). Maintaining consistency of digital twin models: Exploring the potential of graph-based approaches. *2024 50th Euromicro Conference on Software Engineering and Advanced Applications (SEAA)*, 152–159.
https://doi.org/10.1109/SEAA64295.2024.00031

4. **Muctadir**, **H. M.**, Manrique Negrin, D. A., Gunasekaran, R., Cleophas, L., van den Brand, M., & Haverkort, B. R. (2024). Current trends in digital twin development, maintenance, and operation: An interview study. *Software and Systems Modeling*, *23*(5), 1275–1305.
https://doi.org/10.1007/s10270-024-01167-z

5. Bogachenkova, V., Martins, E. C., Jansen, J., Olteniceanu, A.-M., Henkemans, B., Lavin, C., Nguyen, L., Bradley, T., Fürst, V., **Muctadir**, **H. M.**, van den Brand, M., Cleophas, L., & Serebrenik, A. (2023). Lama: A thematic labelling web application. *Journal of Open Source Software*, *8*(85), 5135.
https://doi.org/10.21105/joss.05135

6. Liu, X., van den Brand, M., **Muctadir**, **H. M.**, & van de Molengraft, R. (2023). Ml-based digital twin for anomaly detection: A case-study on turtle soccer robots. *2023 49th Euromicro Conference on Software*

Engineering and Advanced Applications (SEAA), 179–182.
https://doi.org/10.1109/SEAA60479.2023.00035

7 **Muctadir**, **H. M.**, König, L., Weber, T., Amrani, M., & Cleophas, L. (2023). Co-evolving meta-models and view types in view-based development. *2023 ACM/IEEE International Conference on Model Driven Engineering Languages and Systems Companion (MODELS-C)*, 954–963.
https://doi.org/10.1109/MODELS-C59198.2023.00150

8 Walravens, G., **Muctadir**, **H. M.**, & Cleophas, L. (2022). Virtual soccer champions: A case study on artifact reuse in soccer robot digital twin construction. *Proceedings of the 25th International Conference on Model Driven Engineering Languages and Systems: Companion Proceedings*, 463–467.
https://doi.org/10.1145/3550356.3561586

9 van den Brand, M., Cleophas, L., Gunasekaran, R., Haverkort, B., Negrin, D. A. M., & **Muctadir**, **H. M.** (2021). Models meet data: Challenges to create virtual entities for digital twins. *2021 ACM/IEEE International Conference on Model Driven Engineering Languages and Systems Companion (MODELS-C)*, 225–228. https://doi.org/10.1109/MODELS-C53483.2021.00039

10 **Muctadir**, **H. M.** (2020, October). *Model as a service : Towards a discovery platform for internet of food* [Doctoral dissertation] [EngD thesis.]. Technische Universiteit Eindhoven.
https://pure.tue.nl/ws/portalfiles/portal/163366772/2020_10_15_ST_Muctadir_HM.pdf

11 Dey, E. K., & **Muctadir**, **H. M.** (2014). Chest x-ray analysis to detect mass tissue in lung. *2014 International Conference on Informatics, Electronics & Vision (ICIEV)*, 1–5.
https://doi.org/10.1109/ICIEV.2014.6850788

Industrial Experience

2018 – 2020 **Technological designer in training (part of EngD degree)**
Eindhoven University of Technology, The Netherlands.
*During the EngD program, I contributed to several projects. First, in collaboration with **Philips Research**, we integrated AI into their remote healthcare services. My responsibilities included maintaining user stories and overseeing development. Second, our team developed software and mechanical systems for **agricultural drones**, enabling them to autonomously measure soil quality at specified locations. I managed the project, handled scoping, and communicated with stakeholders. Third, in partnership with **ASML**, we created a tool for managing software project dependencies and scope within an IDE. My role encompassed system design and implementation. Finally, for my thesis, I worked with **Unilever** to develop a micro-service based platform for sharing computational models across organisations.*

2017 –2018 **Software Engineer**
Drops Technologies, Germany.
I was involved in a variety of tasks, including web services and web application development using .NET MVC, WebApi2, and Angular. Additionally, I implemented a mixed reality Hololens application using Unity3D, created a WebRTC-based video chat application, and organized development activities. I was also responsible for student developer recruitment, supervision, and team activities.

2015 –2016 **Student Software Engineer**
FEV GmbH, Germany.
*I implemented FEV-specific plugins of the dSpace Synect and various task automation tools using Python. I also did my **master thesis** here and developed an extensible and modular framework for analyzing similarities among software components and generated reports showing similarity results to help software development teams maintain software product lines with minimal effort.*

2012 – 2014 **Software Engineer**
Streams Tech Limited, Bangladesh.
I analyzed, designed, and developed web and desktop applications. Projects included creating a software project management web app using C#, ASP.NET MVC, and AngularJS, and a desktop app for generating digital graph data from scanned images using C# .NET and Windows Forms.

Academic experiences and activities

Teaching at Eindhoven University of Technology

- 2024 — Instructor at 2nd year computer science bachelor's course Software Design (`2IRR00`)
- 2023 — Supervised a group of bachelor students for final Software Engineering Project (`2IPE0`)
- 2021 – 2023 — Instructor at 2nd year computer science bachelor's course Programming Methods (`2IPC0`)

Workshops, talks, and research visits

- 2025 — Presented our SoSyM journal paper titled "Current trends in digital twin development, maintenance, and operation: An interview study" at the *SE2025 conference at Karlsruhe, Germany*
- 2024 — Participated in the workshop on *Digital Twins for Disaster Early Warning Systems* organised by *Netherlands eScience Center* at *CWI, Amsterdam*
- Received an invitation to present our SoSyM journal paper titled "Current trends in digital twin development, maintenance, and operation: An interview study" at the *Journal First track of MODELS 2024 conference at Linz, Austria*
- 2023 — Participated in *19th CAMPaM workshop* on multi-paradigm modeling, model-driven engineering, digital twins *at Bellairs Research Institute, Barbados*
- Presented about our interview study on current trends in digital twin development, maintenance, and operation *at VERSEN (Dutch organisation of software engineering research) symposium*
- 2022 — Participated in *8th NEMO summer school* focusing on the design and implementation of Enterprise Digital Twins and Ecosystems based on conceptual modelling methods *at University of Vienna, Austria*
- Participated in *MDENet Annual Symposium* on model-driven engineering *at Kings College London, UK*
- Participated in *IPA (Dutch institute of programming research and algorithmics) Fall Days* on Scalable and Versatile Software Analytics: ML and NLP to the Fore
- 2021 — Presented about inconsistency detection among cross-domain digital twin models at *ICT Open, yearly Dutch national ICT symposium*

Awards

- 2024 — Best paper award at *SEAA 2024 conference* for the paper "Maintaining consistency of digital twin models: exploring the potential of graph-based approaches" at *Paris, France*
- 2022 — MDENet travel funding to join the *MDENet annual symposium at Kings College London, UK*

Services

- 2025 — Program committee member at ICMM workshop at STAF2025 conferences.
- 2020 – 2024 — As a sub-reviewer, reviewed several scientific articles submitted to MODELS, EDTconf, and SPLC.
- 2018 – 2020 — As a board member of ATMOS (association of EngD students at TU Eindhoven), I co-organized various events.

Student Supervision

2024
- Yanyifan Liao. *Consistency analysis of models used in a brewery digital twin*
  Ongoing master thesis co-supervising with Loek Cleophas
- Emre Kenar. *Integrating open-modelica within SMOL, a DSL for creating digital twins*
  Ongoing master thesis co-supervising with Loek Cleophas

2023
- Judith Houdijk. *Taxonomizing and Analyzing Change Impact in Language Oriented Programming*
  Master thesis co-supervised with Loek Cleophas and Andreas Wortmann
- Xingyu Liu. *Digital twin based anomaly detection of Turtle soccer robots*
  Master thesis co-supervised with Mark van den Brand
- Mohammad Ibrahim. *A Graph Database Design for Multi-Domain Model Management*
  Engineering Doctorate thesis co-supervised with Mark van den Brand

2022
- Gijs Walravens. *Towards Digital Twins for soccer robots: a use case in reusing artifacts.*
  Master thesis co-supervised with Loek Cleophas

Skills

Languages
- Strong reading, writing and speaking competencies in *English*.
  Native *Bengali* speaker. Elementary proficiency in *Dutch* and *German*.

Coding
- Python, C#, Java, JavaScript, Matlab, LaTeX

Databases
- MySQL, PostgreSQL, SQLite, Neo4j.

Misc.
- Version control (i.e., Git, SVN), Web application development, Object-oriented software development, Software design and architecture.

References

Available on Request