Matthias Gruber

Dipl.-Ing. (Biomedical Informatics) — Independent Consciousness Researcher

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RESEARCH PROJECT

The Four-Model Theory of Consciousness (FMT)

A simulation-based architecture proposing that consciousness consists of real-time self-simulation organized along two dimensions: scope (world vs. self) and mode (implicit/learned vs. explicit/simulated). Generates nine falsifiable predictions testable with fMRI, EEG, and psychopharmacological methods. Developed 2003–2015; formalized for peer review 2024–2025.

Keywords: *consciousness, self-simulation, metacognition, qualia, criticality*

PUBLICATIONS

Consciousness & Intelligence

Gruber, M. (2025) "The Four-Model Theory: A Simulation-Based Architecture of Consciousness." Under review, *Neuroscience of Consciousness*. Preprint: doi.org/10.5281/zenodo.18669891

Gruber, M. (2025) "Recursive Iteration: A Model of Human and Artificial Intelligence." Submitted to *New Ideas in Psychology*. Preprint: osf.io/preprints/osf/kctvg

Gruber, M. (2015) *Die Emergenz des Bewusstseins* [The Emergence of Consciousness]. Monograph, self-published (German). ISBN 978-3-7345-4765-4.

Simulation, AI & Engineering

Gruber, M. (2010) *A Generic Framework for Discrete Simulation Based Optimization*. Doctoral research, TU Wien. ISBN 978-3838152233.

Gruber, M. et al. (2010) "Anticipatory Production Control: Simulation Based Heuristic Optimization." In: März et al. (Eds.), *Simulation und Optimierung in Produktion und Logistik*, Springer.

Heinz, E.A., Kunze, K.S., Gruber, M. et al. (2006) "Using Wearable Sensors for Real-time Recognition Tasks in Games of Martial Arts." *Proc. 2nd IEEE Symposium on Computational Intelligence and Games*, pp. 98–102.

EDUCATION

2009 – 2011 Doctoral research (ABD) — TU Wien

Discrete Simulation Based Optimization. Supervisor: Prof. Felix Breitenecker. Research published (Springer, 2010).

2005 – 2007 Dipl.-Ing. Biomedical Informatics — UMIT, Hall in Tirol

Specialization in bioinformatics and artificial intelligence. Thesis grade: A (96/100).

2002 – 2005 BSc Medical Informatics — UMIT, Hall in Tirol

Research assistant in Wearable Computing (Prof. Paul Lukowicz). Thesis grade: B (90/100).

1998 – 2002 Medical studies (pre-clinical) — University of Innsbruck

Physics, chemistry, biochemistry, biology, anatomy.

CONFERENCE ACTIVITY (2026)

• "Formalizing the Real-Virtual Gap" — Neurophenomenology satellite workshop, abstract submitted.

• "Substrate-Independent Consciousness and the Ethics of Artificial Minds" — AISB Convention, extended abstract submitted.

RELEVANCE TO CONSCIOUSNESS & METACOGNITION RESEARCH

FMT's architecture directly engages current debates in consciousness science. The explicit self-model (ESM) component provides a structural account of metacognition — the system monitoring and evaluating its own cognitive states — connecting to Fleming's quality space framework (2024) and the COGITATE adversarial collaboration methodology. FMT generates a novel 2×2 factorial prediction (scope × mode) that discriminates between GNW, IIT, and HOT — a prediction no current theory makes. The framework also addresses conditions where metacognitive monitoring fails (dreaming, psychedelics, anesthesia) through specific predictions about criticality disruption and simulation decoupling.

PROFESSIONAL EXPERIENCE

2018 – present R&D AI Transformation Manager & AI Officer — Ivoclar AG, Liechtenstein

2011 – 2018 Scrum Master / Process Manager — OMICRON Electronics, Austria

2009 – 2011 Research Scientist — V-Research GmbH, Austria

Discrete simulation, semantics, text mining. Guest lectures at TU Wien.

2007 – 2009 Research Project Manager — PROFACTOR GmbH, Austria

Managed ~€5M in research projects (voestalpine, Novartis, Roche). FFG award.

ADDITIONAL

Languages: German (native), English (fluent), French (basic)

Technical: Python, C#/.NET, AI/ML systems, simulation modeling

Certifications: PPL(A) pilot license, ICAO English Level 6; Court-approved expert for software development (Austria)