Stanford



Paul Schmiedmayer

Instructor, Computational Medicine

CONTACT INFORMATION

- **Administrative Contact**

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Bio

BIO

Paul Schmiedmayer is a computer scientist and Instructor in the Stanford Division of Computational Medicine. His research group develops computational methods for multimodal and agentic AI in patient-centered care, prevention, and biomedical research, with a focus on cardiometabolic health. He works with researchers and clinical collaborators to connect advances in AI with the needs of patients and care teams.

He earned his doctorate in computer science at the Technical University of Munich, where his research focused on distributed systems and methods for maintaining interoperable data exchange as software systems evolve. He also holds master's and bachelor's degrees in informatics from the Technical University of Munich. He joined Stanford University in 2022 and completed his postdoctoral training there in 2025, working on wearable data, patient-facing AI, and interoperable systems for digital health research. In 2026, he was appointed as an Instructor in the Stanford Division of Computational Medicine.

His research spans multimodal AI systems, learning from large-scale wearable data, and agentic systems. His group studies how agents use physiological signals, health records, and patient experiences to support care between visits and conduct reproducible scientific analyses. This work connects patient-facing AI and digital interventions with AI co-scientists that help researchers formulate and test hypotheses across biomedical datasets.

Open-source development and international collaboration are central to his research. His group shares software, models, and research tools that enable others to reproduce analyses, extend computational methods, and adapt them to new populations and clinical settings. Working with collaborators across institutions and countries, he connects AI methods, wearable studies, and patient-facing applications through shared data standards and reproducible workflows. These collaborations support research across devices and cohorts and the translation of computational advances into patient care.

ACADEMIC APPOINTMENTS

- Instructor, Computational Medicine

PROFESSIONAL EDUCATION

- Postdoctoral training, Stanford University (2025)

- Dr. rer. nat., Technical University of Munich , Computer Science (2022)
- M.Sc., Technical University of Munich , Informatics (2019)
- B.Sc., Technical University of Munich , Informatics (2017)

LINKS

- Schmiedmayer Lab: https://schmiedmayerlab.stanford.edu/
- Research and Publications: https://schmiedmayerlab.stanford.edu/research/
- Projects and Open-Source Software: https://schmiedmayerlab.stanford.edu/resources/
- Research Opportunities: https://schmiedmayerlab.stanford.edu/join/
- Schmiedmayer Lab on GitHub: https://github.com/SchmiedmayerLab

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Dr. Schmiedmayer advances computational methods for multimodal AI and agentic systems in patient-centered care, prevention, and biomedical research. With a focus on cardiometabolic health, he connects learning from longitudinal patient data with agents that support care and scientific discovery.

Multimodal Computational Methods

Physiological measurements need context to inform patient care. Dr. Schmiedmayer investigates multimodal models that reason jointly over time-series signals, structured health records, and text from clinical notes and patient reports. These methods relate changes in physiology to symptoms and care events while preserving temporal information beyond predefined summaries. His research examines methods for generating descriptions from measured signals and aligning them with clinical context. Large-scale wearable studies and open datasets support training and reproducible evaluation of models across devices, populations, and clinical settings. Research on retrieval from long recordings and efficient on-device inference examines how models can identify clinically relevant evidence across a patient's history and make use of it on personal devices.

Learning and Evaluation from Patient Data

Clinic visits capture only part of a person's health. Dr. Schmiedmayer and his team combine passive wearable and smartphone measurements with patient reports, clinical records, and care interactions. These complementary sources reveal how patterns in physiology, activity, and sleep relate to symptoms, goals, and experiences in everyday life. Analysis of patient portal messages and interviews alongside longitudinal health data identifies information needs and informs clinically relevant training and evaluation tasks. These analyses connect what patients want to understand with the evidence and explanations an agent provides. Personalized digital interventions connect wearable measurements with physical activity support and smartphone activity with digital wellbeing. Prospective studies evaluate effects on understanding, engagement, and behavior, including interventions addressing problematic smartphone use.

Patient-Centered Agentic Systems

Patient needs change as new health information becomes available. Dr. Schmiedmayer investigates agent architectures that coordinate multimodal reasoning, evidence retrieval, and action while maintaining context across visits. Studies of record-grounded text and voice interactions examine how agents personalize support as a patient's needs and circumstances evolve. His research examines how agents assess uncertainty, use tools, and determine when clinician or researcher review is needed. Evaluation connects the reliability of reasoning and actions with patient understanding, communication with care teams, and clinician workload. For scientific analyses, these agent capabilities underpin his research on AI co-scientists that

formulate and test hypotheses. Reproducible workflows connect findings to the underlying data, code, and analysis steps, allowing researchers to inspect the evidence supporting scientific conclusions.

Through open-source software, models, and research tools, Dr. Schmiedmayer and his team make this work available for others to examine, reproduce, and extend. Core tools include Grove, a modular framework for digital health applications; Trove, a platform for research studies; Plainly, a patient-facing AI platform; and Heartwood, an agentic research harness. International collaborations connect computational research with wearable studies and patient-facing applications across institutions and clinical settings. Shared data standards and reproducible workflows support evaluation across devices and cohorts and the translation of computational methods into patient care and biomedical research.

Publications

PUBLICATIONS

- **Design and rationale of the my heart counts cardiovascular health study: a large-scale, fully digital biobank, and randomized trial of large language model-driven coaching of physical activity.** *American journal of preventive cardiology*
  Schmiedmayer, P., Johnson, A., Schuetz, N., Kollmer, L., Goldschmidt, P., Delgado-SanMartin, J., Zhang, K. W., Mantena, S. D., Tolas, A., Montalvo, S., Ramirez-Posada, M., O'Sullivan, J. W., Oppezzo, et al
  2026; 28: 101565

- **Bloom: Designing for LLM-Augmented Behavior Change Interactions**
  Jorke, M., Genc, D., Teutschbein, V., Sapkota, S., Chung, S., Schmiedmayer, P., Campero, M., King, A. C., Brunskill, E., Landay, J. A., ACM
  ASSOC COMPUTING MACHINERY.2026

- **OpenMHC: Accelerating the Science of Wearable Foundation Models**
  Schuetz, N., Bai, Y., Pan, L., Eggert, E., Nerrise, F., Delgado-SanMartin, J., Rosenblattl, M., Gurbanova, M., Asadi, M., Johnson, A., Schmiedmayer, P., Wang, D., Lawrie, et al
  NeurIPS 2026, Evaluations & Datasets Track (accepted conference paper).
  2026

- **OpenTSLM: Time-Series Language Models for Reasoning over Multivariate Medical Text- and Time-Series Data** *43rd International Conference on Machine Learning (ICML 2026)*
  Langer, P., Kaar, T., Rosenblattl, M., Xu, M. A., Chow, W., Maritsch, M., Jakob, R., Wang, N., Liu, J., Verma, A., Han, B., Kim, D., Chubb, et al
  2026: 62642-62676

- **LLMonFHIR: A Physician-Validated, Large Language Model-Based Mobile Application for Querying Patient Electronic Health Data.** *JACC. Advances*
  Schmiedmayer, P., Rao, A., Zagar, P., Aalami, L., Ravi, V., Zahedivash, A., Yao, D. H., Fereydooni, A., Aalami, O.
  2025; 4 (6 Pt 1): 101780

- **A Multicenter Randomized Controlled Trial of a Digital Health Intervention for Medication Optimization in Heart Failure: The ENGAGE-HF Trial Outcomes.** *Circulation. Heart failure*
  Dorsch, M. P., Gilotra, N. A., Spaulding, E. M., Martin, S. S., Zhao, H., Wilson, G. A., Poddar, M., Verma, A., Schmiedmayer, P., Kraft, P., Rodriguez, F., Azizi, Z., Hwang, et al
  2026

- **Information Needs of Patients with Early-Stage Cardiovascular-Kidney-Metabolic Syndrome: A Large-Scale Analysis of Patient Portal Messages**
  Lutz, M., Ngo, S., Hwang, J., Somani, S., Maron, D. J., Sandhu, A. T., Schmiedmayer, P., Rodriguez, F.
  LIPPINCOTT WILLIAMS & WILKINS.2026: A8237

- **Population-Level Dosing Trajectories and Cardiometabolic Changes with GLP-1 Receptor Agonists for Weight Loss**
  Hwang, J., Furst, A., Schmiedmayer, P., Somani, S., Maron, D., Sandhu, A. T., Rodriguez, F.
  LIPPINCOTT WILLIAMS & WILKINS.2026: A8685

- **Language eligibility criteria and enrolled racial and ethnic composition in US clinical trials: a cross-sectional study.** *medRxiv : the preprint server for health sciences*
  Tolas, A. M., Du, L., Schutz, N., Schmiedmayer, P., O'Sullivan, J. W., Johnson, A., Longenecker, C. T., Sarraju, A., Rodriguez, F., Yang, E., Kim, D. S.

2026

- **Spezi Data Pipeline: Streamlining FHIR-based interoperable digital dealth data workflows.** *NPJ digital medicine*
  Bikia, V., Schmiedmayer, P., Zahedivash, A., Aalami, L., Rao, A., Ravi, V., Turk, M., Ceresnak, S. R., Aalami, O.
  2026

- **TS-Haystack: A Multi-Task Retrieval Benchmark for Long-Context Time-Series Reasoning**
  Zumarraga, N., Kaar, T., Wang, N., Tennien, W., Hasanli, A., Rosenblattl, M., Wu, F., Riehl, K., Xu, M. A., Kreft, M., O'Sullivan, K., Fleisch, E., Schmiedmayer, et al
  arXiv (preprint).
  2026

- **The Pediatric Apple Watch Study (PAWS): A Prospective Assessment of Wearables for Arrhythmia Detection in Children**
  Zahedivash, A., Schmiedmayer, P., Reddy, S., Chubb, H., Giacone, H. M., Motonaga, K. S., Goodyer, W. R., Silva, B., Bikia, V., Ravi, V., Aalami, O., Dubin, A. M., Trela, et al
  Heart Rhythm 23(4, Supplement), S54–S55 (conference abstract DH-534540-002).
  2026

- **AuscuTSLM: Patient-Level Multimodal Question Answering from Multi-Site Auscultation Recordings** *Interspeech 2026*
  Wu, F., Wang, T., Zumarraga, N., Wang, N., Kreft, M., O'Sullivan, K., Zorrilla, P., Fleisch, E., Aalami, O., Schmiedmayer, P., Jakob, R., Langer, P.
  ISCA.2026: 5526-5531

- **PocketTSLM: Deploying an On-Device Soft-Prompt Time-Series Language Model for Privacy-Preserving Smartphone Reasoning**
  Rosenblattl, M., Krishnaswamy, N., Nissen, L., Milling, M., Zumarraga, N., Wang, N., Kaar, T., Jakob, R., Schuller, B., Fleisch, E., Langer, P., Schmiedmayer, P.
  COLM 2026 DAIH Workshop (accepted non-archival workshop poster).
  2026

- **TimeNet: An Extensible Unified Data Infrastructure for Next-Generation Temporal Foundation Models**
  Maritsch, M., Stoffregen, T., Kaar, T., Riemer, B., Xu, M. A., Rosenblattl, M., Liu, J., Zumarraga, N., Wu, Y., Herasymuk, D., Rastogi, S., Yoon, H., Huang, et al
  arXiv (preprint).
  2026

- **Language eligibility criteria and enrolled racial and ethnic composition in US clinical trials: a cross-sectional study**
  Tolas, A. M., Du, L., Schutz, N., Schmiedmayer, P., O'Sullivan, J. W., Johnson, A., Longenecker, C. T., Sarraju, A., Rodriguez, F., Yang, E., Kim, D.
  medRxiv (preprint).
  2026

- **How do people plan digitally: An in-the-wild investigation of task planning through a smartphone app**
  Halder, S., Zimmermann, I., Körte, L., Mehlig, L., Schmiedmayer, P., Grüning, D.
  arXiv (preprint).
  2026

- **The CAST-framework: Measure and model social media use as a multi-level phenomenon through real-world applications**
  Grüning, D., Doeninghaus, J., Efchary, Z., Kondo, Y., Dunnell, K. F., Fischer, L., Zimmermann, I., Körte, L., Mehlig, L., Riedel, F., Schmiedmayer, P.
  arXiv (preprint).
  2026

- **OpenTSLM TeeMoE: A Unified Time-Series Language Model for Forecasting, Contextual Prediction, and Reasoning**
  Chen, T., Stoffregen, T., Xu, M., Kaar, T., Maritsch, M., Pompei, G., Zumarraga, N., Jakob, R., Schmiedmayer, P., Langer, P., Liu, J.
  arXiv (preprint).
  2026

- **DrugTargetWorld: A Synthetic Biobank for Training and Benchmarking AI Scientists**
  Margolis, S., Schmiedmayer, P., Huang, A., Chen, E., Bhattacharjee, I., Shah, A., Viggiano, B., Cao, F., Reddy, S., Xia, R., O'Sullivan, J., Katz, D., Wheeler, et al
  arXiv (preprint).
  2026

- **Beyond Screen Time: Demonstrating the Value of App Activity Logs to Understand User Behavior Further**
  Schmitt, O., Gieseler, P., Riedel, F., Wolf, D., Stern, A., Schmiedmayer, P., Grüning, D.
  arXiv (preprint).
  2026

- **TimeCap: A Scalable Open-Source Pipeline for Captioning Wearable Health Time-Series Data**
  Rosenblattl, M., Gurbanova, M., Deck, K., Schuetz, N., Kaar, T., Milling, M., Zumarraga, N., Wang, N., Zhang, K. W., Johnson, A., Jakob, R., Schuller, B., Fleisch, et al
  arXiv (preprint).
  2026

- **Grounding Language Models in Behavioral Science to Scale Physical Activity Interventions for Hispanic/Latinx Populations**
  Mantena, S., Johnson, A., Schuetz, N., Tolas, A., Montalvo, S., Delgado-SanMartin, J., Ramirez-Posada, M., Du, L., Zhang, S., Huynh, A., Oppezzo, M., King, A. C., Schmiedmayer, et al
  medRxiv (preprint).
  2026

- **Digital (self-)nudging: A framework for a continuum of user agency**
  Grüning, D., Stock, F., Beermann, V., Enkmann, J., Lorenz-Spreen, P., Herzog, S., Schmiedmayer, P., Orben, A., Hertwig, R.
  PsyArXiv (preprint).
  2026

- **TimeRLM: Recursive Language Models Enable Precise Anomaly Localization in Long-Context Time-Series**
  Zumarraga, N., Steno, L., Wang, N., Rosenblattl, M., Kaar, T., Xu, M. A., O'Sullivan, K., Kreft, M., Fleisch, E., Schmiedmayer, P., Langer, P., Jakob, R.
  arXiv (preprint).
  2026

- **The ABC of Digital Health: A Framework for Translating Digital Health Interventions into Real-World Applications**
  Grüning, D., Beermann, V., Enkmann, J., Hoch, R., Hertwig, R., Schmiedmayer, P.
  arXiv (preprint).
  2026

- **Population-Based Prediction Equations for the 6-Minute Walk Test: Findings From the My Heart Counts Study**
  Tolas, A., Johnson, A., Schuetz, N., Ramirez-Posada, M., Montalvo, S., Yang, E., Schmiedmayer, P., Rodriguez, F., Lawrie, A., Myers, J. N., Ashley, E., Kim, D.
  JMIR Preprints (preprint).
  2026

- **How Well Do Multimodal Models Reason on ECG Signals?**
  Xu, M. A., Haresamudram, H., Liu, C. W., Langer, P., Pradeepkumar, J., Mao, W., Ferns, S. J., Verma, A., Sun, J., Schmiedmayer, P., Liu, X., McDuff, D., Fox, et al
  arXiv (preprint).
  2026

- **Fine-tuning LLMs in behavioral psychology for scalable health coaching.** *NPJ cardiovascular health*
  Mantena, S., Johnson, A., Oppezzo, M., Schütz, N., Tolas, A., Doijad, R., Mattson, C. M., Lawrie, A., Ramirez-Posada, M., Schmiedmayer, P., Linos, E., King, A. C., Rodriguez, et al
  2025; 2 (1): 48

- **Dynamic fog computing for enhanced LLM execution in medical applications** *SMART HEALTH*
  Zagar, P., Ravi, V., Aalami, L., Krusche, S., Aalami, O., Schmiedmayer, P.
  2025; 36

- **Enhancing Distress Tolerance Skills in Adolescents With Anorexia Nervosa Through the BALANCE Mobile App: Feasibility and Acceptability Study.** *JMIR formative research*
  Miranda, C., Matheson, B., Datta, N., Whyte, A., Yang, H. J., Schmiedmayer, P., Ravi, V., Aalami, O., Lock, J.
  2025; 9: e70278

- **Spatial Continuity: Investigating Use Cases of Spatial Computing for Users with Low Vision**
  Heidekrueger, P., Bruegge, B., Aalami, O., Schmiedmayer, P., ACM

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- **Quantitative Digitography and Home Diaries for Parkinson's Disease (PD) Motor State Evaluation**
  Daley, K., Negi, A., Karjagi, S., Abay, A., Acharyya, P., Schmiedmayer, P., Wilkins, K., Bronte-Stewart, H.
  Movement Disorders 40(S1) (conference abstract).
  2025
- **Medicine on the Edge: Comparative Performance Analysis of On-Device LLMs for Clinical Reasoning**
  Nissen, L., Zagar, P., Ravi, V., Zahedivash, A., Reimer, L., Jonas, S., Aalami, O., Schmiedmayer, P.
  arXiv (preprint).
  2025
- **Toward Scalable Access to Neurodevelopmental Screening: Insights, Implementation, and Challenges**
  Bauer, A., Bosl, W., Aalami, O., Schmiedmayer, P.
  arXiv (preprint).
  2025
- **GPTCoach: Towards LLM-Based Physical Activity Coaching**
  Jorke, M., Sapkota, S., Warkenthien, L., Vainio, N., Schmiedmayer, P., Brunskill, E., Landay, J. A., ACM
  ASSOC COMPUTING MACHINERY.2025
- **Comprehensive real time remote monitoring for Parkinson's disease using Quantitative DigitoGraphy.** *NPJ Parkinson's disease*
  Hoffman, S. L., Schmiedmayer, P., Gala, A. S., Wilkins, K. B., Parisi, L., Karjagi, S., Negi, A. S., Revlock, S., Coriz, C., Revlock, J., Ravi, V., Bronte-Stewart, H.
  2024; 10 (1): 137
- **Impact of Workspace Environmental Features on Occupant Wellbeing: A Naturalistic Pilot Study**
  Xu, J., Tavakoli, A., Jorke, M. J., Ruth, P. M., Vainio, N., Schmiedmayer, P., Jain, S., Landay, J. A., Billington, S. L.
  edited by Akinci, B., Berges, M., Jazizadeh, F., Menassa, C. C., Yeoh, J.
  AMER SOC CIVIL ENGINEERS.2024: 573-582
- **Utility of smart watches for identifying arrhythmias in children.** *Communications medicine*
  Zahedivash, A., Chubb, H., Giacone, H., Boramanand, N. K., Dubin, A. M., Trela, A., Lencioni, E., Motonaga, K. S., Goodyer, W., Navarre, B., Ravi, V., Schmiedmayer, P., Bikia, et al
  2023; 3 (1): 167
- **CardinalKit: open-source standards-based, interoperable mobile development platform to help translate the promise of digital health.** *JAMIA open*
  Aalami, O., Hittle, M., Ravi, V., Griffin, A., Schmiedmayer, P., Shenoy, V., Gutierrez, S., Venook, R.
  2023; 6 (3): ooad044
- **Reducing the Impact of Breaking Changes to Web Service Clients During Web API Evolution**
  Schmiedmayer, P., Bauer, A., Bruegge, B., IEEE
  IEEE COMPUTER SOC.2023: 1-11
- **The Path to a Modular and Standards-Based Digital Health Ecosystem**
  Schmiedmayer, P., Ravi, V., Aalami, O.
  arXiv (preprint).
  2023
- **Enriching Cloud-native Applications with Sustainability Features**
  Vitali, M., Schmiedmayer, P., Bootz, V., IEEE
  IEEE COMPUTER SOC.2023: 21-31
- **Global Software Engineering in a Global Classroom**
  Schmiedmayer, P., Chatley, R., Bernius, J., Krusche, S., Chaika, K., Krinkin, K., Bruegge, B., IEEE Comp Soc
  IEEE COMPUTER SOC.2022: 113-121
- **Designing Evolvable Web Services**
  Schmiedmayer, P.

Technical University of Munich (doctoral dissertation).
2022

- **Transitioning to a Large-Scale Distributed Programming Course**
  Schmiedmayer, P., Reimer, L., Jovanovic, M., Henze, D., Jonas, S.
  edited by Daun, M., Hochmuller, E., Krusche, S., Brugge, B., Tenbergen, B.
  IEEE.2020: 256-261

- **Apodini: An Internal Domain Specific Language to Design Web Services** *21st International Middleware Conference Doctoral Symposium*
  Schmiedmayer, P.
  Association for Computing Machinery.2020: 47-49

- **Fog Horizons - A Theoretical Concept to Enable Dynamic Fog Architectures**
  Henze, D., Schmiedmayer, P., Bruegge, B., ACM
  ASSOC COMPUTING MACHINERY.2019: 41-50