Ali Reza Soleymani Taloubaghi

Genetic Epidemiology · Mendelian Randomization · Causal Inference · AI for Biomedical Data

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RESEARCH PROFILE

Researcher at the interface of **statistical genetics and artificial intelligence**. I design and run end-to-end two-sample Mendelian randomization (MR) studies on GWAS summary statistics from UK Biobank, FinnGen, GLGC and the GWAS Catalog, including multivariable, drug-target, clustering (MR-Clust), CAUSE and colocalisation analyses, together with systematic review and meta-analysis. I combine this with an M.Sc. in AI (GPA 4.00/4.00, ranked 1st) and production-grade software engineering: I am the lead developer of **MR Studio**, a validated desktop platform that makes rigorous MR reproducible for clinicians. Co-author of four peer-reviewed MR papers; first author of manuscripts in preparation for Q1 journals. In TIGP Bioinformatics I aim to develop robust causal-inference and machine-learning methods for East Asian biobank data (e.g. Taiwan Biobank).

EDUCATION

Ph.D. Program, Engineering Science and Technology — Data Science & AI Applications — Sep 2023 – present
National Yunlin University of Science and Technology (YunTech), Taiwan

- Admitted on faculty recommendation as a dual-degree student after an outstanding first M.Sc. semester. Independent research line in MR and genetic epidemiology with external collaborators.

M.Sc. Artificial Intelligence GPA 4.00 / 4.00 · Avg. 96.46 / 100 · Rank 1 / 15 — Feb 2023 – Jan 2025
International Graduate School of AI, YunTech, Taiwan — English-medium program

- Thesis: *Improving the Prediction Performance of Autonomous Vehicle Trajectories Based on Enhanced DenseTNT* (Advisor: Assoc. Prof. Kuei-Chung Chang). VectorNet + graph-attention encoder, mixture-density goal estimation and RL-based goal-set selection; reduced minADE on the Waymo Open Motion Dataset from 1.039 to 0.803 (−23%) and miss rate from 0.18 to 0.14.
- Coursework: Machine Learning (98), Deep Learning (99), Mathematical Foundations for AI (99), Evolutionary Computing (100), Distributed Computing (100), Advanced Computer Vision (95).

M.Sc. Civil Engineering (Earthquake Engineering) — 2016
Urmia University, Iran — Thesis: *Optimal Seismic Design of Steel Structures Considering Soil–Structure Interaction Using Soft Computing* (metaheuristic optimisation).

B.Sc. Civil Engineering — *Urmia University, Iran* — 2012

PEER-REVIEWED PUBLICATIONS

4. Habibi D, Teymoori F, ..., **Soleymani Taloubaghi A**, ..., Hakonarson H, Azizi F, Hedayati M, Daneshpour MS, Mansourian M, Akbarzadeh M. High serum monounsaturated fatty acid levels may increase risk of cardiovascular disease: a Mendelian randomization study. *Iranian Journal of Medical Sciences* 2026;51(8):543–553. doi:10.30476/ijms.2026.107801.4239
3. Akbarzadeh M, Haghighatdoost F, Ataei Kachouei A, **Soleymani Taloubaghi A**, ..., Habibi D. Genetic predisposition to serum 25-hydroxyvitamin D concentrations does not influence the risk of celiac disease in European ancestry: meta-analysis and Mendelian randomization. *Medicine (Baltimore)* 2026;105(27):e49587. doi:10.1097/MD.0000000000049587
2. Habibi D, Hamraz I, ..., **Soleymani Taloubaghi A**, ..., Akbarzadeh M, Mansourian M. Investigation of the causal relationship of saturated fatty acids on heart stroke: two-sample Mendelian randomization. *BMC Nutrition* 2025;11(1):116. doi:10.1186/s40795-025-01094-2

1. Habibi D, Teymoori F, ..., **Soleymani Taloubaghi A**, ..., Akbarzadeh M, Mansourian M. Causal effect of serum 25-hydroxyvitamin D concentration on cardioembolic stroke: evidence from two-sample Mendelian randomization. *Nutrition, Metabolism & Cardiovascular Diseases* 2024;34(5):1305–1313. doi:10.1016/j.numecd.2024.02.013

Manuscripts in preparation (target: Q1 journals) — * first author

a. **Soleymani Taloubaghi A***, Habibi D, Akbarzadeh M, et al. *MR Studio: a validated, reproducible desktop platform for two-sample Mendelian randomization.* Software / methods paper.

b. **Soleymani Taloubaghi A***, et al. *Genetically predicted risk factors for preeclampsia and hypertensive disorders of pregnancy: a systematic review and meta-analysis of MR studies with de novo analyses in FinnGen and UK Biobank.* (143 studies; drug-target MR, MVMR, omics evidence map.)

c. **Soleymani Taloubaghi A***, Habibi D, Akbarzadeh M, Haghighatdoost F, et al. *Evaluating the distinct pleiotropic effects of omega-3 fatty acids on triglycerides: evidence from Mendelian randomization* (discovery + independent replication, MR-Clust, two-step MR/MVMR).

d. Co-author: *Remnant cholesterol and non-alcoholic fatty liver disease: a Mendelian randomization study* (three outcome GWAS, positive control, LDSC).

e. Co-author: *Maternal genetically predicted iron status and offspring birth weight: a multi-method MR triangulation study* (MRlap, CAUSE, colocalisation at TMPRSS6/HFE/TF).

f. Co-author: *Anthropometric measures and sarcoidosis: a two-sample MR analysis revealing a specific role of hip circumference.*

g. Co-author (lead analyst): *Family functioning and marital adjustment: multivariate, machine-learning and causal-inference analyses*, and a companion genetic-correlation/MR study in UK Biobank (with Prof. A. Feizi, Isfahan Univ. of Medical Sciences).

RESEARCH SOFTWARE

MR Studio — lead developer & designer (with Dr. D. Habibi) R · Rust/Tauri · JavaScript 2026 – present

- Cross-platform desktop application guiding a full MR study: question → data (OpenGWAS, local GWAS import) → LD clumping (PLINK, 1000 Genomes) → harmonisation → IVW, MR-Egger, weighted median/mode, MR-PRESSO, radial MR, Steiger → STROBE-MR report and reproducibility capsule.
- Validated against published benchmarks (Bowden 2016; Hemani 2018: agreement with TwoSampleMR to ~1e-15); ~390 automated tests; CI builds for macOS and Windows.

BioCalX — clinical sample-size calculator for Android — main developer Kotlin · Jetpack Compose · Room 2026

- 20 validated formulas (means, proportions, McNemar, Fisher-Z correlation, sensitivity/specificity, AUC-ROC, case-control, cohort, survival) with formula display, PDF export and APA/Vancouver citations; prepared with Babol University of Medical Sciences.

Genomics & visualisation utilities — automated dbSNP population allele-frequency retrieval; publication-grade MR forest-plot and circular stacked-bar tools (Python). 2024 – 2025

AI applications — *Yara*: LLM-powered knowledge app (FastAPI, LangGraph agent, pgvector hybrid retrieval with reciprocal-rank fusion; native iOS/Android clients). *HSK1 Coach*: SwiftUI language-learning app with spaced repetition and speech recognition (~8.5k lines). 2025 – 2026

RESEARCH EXPERIENCE

Research Collaborator, Genetic Epidemiology & MR — with Dr. Danial Habibi (Babol Univ. of Medical Sciences) and Dr. Mahdi Akbarzadeh (Research Institute for Endocrine Sciences, Shahid Beheshti Univ. of Medical Sciences) 2023 – present

- Lead analyst on two-sample, multivariable and drug-target MR pipelines; GWAS harmonisation, sensitivity analyses, power analysis and figures; manuscript writing and revision.
- Persian translation of Burgess & Thompson, *Mendelian Randomization: Methods for Causal Inference Using Genetic Variants* (2nd ed., CRC Press, 2021), chapters 1–6, undertaken with the author's permission; under scientific review.
- Technical reviewer of the Persian translation of Bergstrom & West, *Calling Bullshit: The Art of Skepticism in a Data-Driven World* (2020).

Research Assistant, International Graduate School of AI, YunTech Apr 2023 – Sep 2024

- Trajectory prediction for autonomous vehicles, knowledge distillation, and multi-modal gesture recognition.

HONORS & AWARDS

Phi Tau Phi Scholastic Honor Society of the Republic of China (Taiwan) — the only international student inducted at YunTech in 2024. 2024

Top student (1st of 15), M.Sc. Artificial Intelligence, YunTech. 2025

Selected (1st rank), Physical Inbound Research Program — summer research-lab program, Hosei University, Tokyo, Japan. Aug 2024

Selected (1st rank), Physical Inbound Research Program — Universiti Pendidikan Sultan Idris, Malaysia. 2023

TEACHING

Teaching Assistant, Special Topics in UAVs and Autonomous Vehicles — YunTech (tutorials, exam supervision) Feb – Jul 2024

Lecturer, Road Construction Engineering — Sariyan Institute of Higher Education, Iran 2016 – 2017

Teaching Assistant, Soil Mechanics (Dr. Amel Sakhi) — Urmia University & University College of Science and Technology, Iran 2013 – 2014

English Instructor (general English to GRE/GMAT preparation) — Negin Khavar Mianeh Institute, Iran 2008 – 2022

TECHNICAL SKILLS

Causal inference & genetic epidemiology

Two-sample, bidirectional, multivariable, drug-target MR; MR-Egger, weighted median/mode, MR-PRESSO, radial MR, MR-RAPS, CAUSE, MRlap, MR-Clust, Steiger; LDSC genetic correlation; colocalisation; double ML, causal forests, E-values.

Statistics & evidence synthesis

Systematic review & meta-analysis (PRISMA, metafor/meta), multiple imputation, penalised regression, latent profile and network analysis, power & sample-size methods.

Machine learning

PyTorch, TensorFlow/Keras, scikit-learn, XGBoost; graph neural networks, attention, reinforcement learning, SHAP/ALE interpretability, nested cross-validation.

Genomic data & tools

GWAS summary statistics (UK Biobank, FinnGen, GLGC, GWAS Catalog, IEU OpenGWAS), 1000 Genomes, PLINK, TwoSampleMR, MendelianRandomization, ieugwasr, GenomicSEM.

Programming & engineering

R, Python, MATLAB, Kotlin, Swift, JavaScript, Rust (Tauri), SQL; Git/GitHub Actions CI, Docker, FastAPI, reproducible pipelines (renv).

Languages

Persian (native) · English (full professional; English-medium M.Sc.; TOEIC certified) · Mandarin Chinese (upper-beginner, certified).

REFERENCES

Assoc. Prof. Kuei-Chung Chang (M.Sc. thesis advisor)
Director, International AI Institute, National Yunlin University of Science and Technology, Taiwan
changkc@yuntech.edu.tw

Asst. Prof. Danial Habibi (principal MR collaborator)
Babol University of Medical Sciences, Iran

Dr. Mahdi Akbarzadeh (senior author, MR collaborations)
Research Institute for Endocrine Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Prof. Saleh Mobayen (research mentor)
Graduate School of Intelligent Data Science, National Yunlin University of Science and Technology, Taiwan
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