Ali Enayat CV

EDUCATION

- Ph.D. (1984), Dept. of Mathematics, Univ. of Wisconsin (Madison), USA.
- B.S. (1979), Dept. of Mathematics, Iowa State Univ. (Ames), USA.

ACADEMIC EMPLOYMENT

- Currently: **Emeritus Professor**, Univ. of Gothenburg (Sweden) and American Univ. (USA); and **Co-investigator** in the project *Epistemic and Semantic Commitments of Foundational Theories* (supported by a grant from the National Science Centre, Poland).
- 2013-2020: **Professor of Logic**, Dept. of Philosophy, Linguistics, and Theory of Science, Univ. of Gothenburg, Sweden.
- 1987-2013: **Professor of Mathematics**, Dept. of Mathematics and Statistics, American Univ., Washington, DC, USA.
- 1985-1987: **Assistant Professor,** Dept. of Mathematics and Computer Science, San Jose State Univ., California, USA.
- 1984-1985: **Assistant Professor**, Dept. of Mathematics, Western Illinois Univ., Macomb, Illinois, USA.

PUBLISHED RESEARCH ARTICLES

1. *The nonmetrizability of uncountable well-ordered spaces* [with A. Abian], **Simon Stevin**, vol. 55, No. 1 (1981), pp. 3-6.
2. *On certain elementary extensions of models of set theory*, **Transactions of American Mathematical Society**, vol. 283, No. 2 (1984), pp. 705-715.
3. *Weakly compact cardinals in models of set theory*, **Journal of Symbolic Logic**, vol. 50, No. 2 (1985), pp. 476-486.
4. *Conservative extensions of models of set theory and generalizations,* **Journal of Symbolic Logic**, vol. 51, No. 4 (1986), pp. 1005-1021.
5. *Undefinable classes and definable elements in models of arithmetic and set theory*, **Proceedings of the American Mathematical Society**, vol. 103, (1988), pp. 1216-1220.
6. *Minimal elementary extensions of models of set theory and arithmetic,* **Archive for Mathematical Logic,** vol**.** 30 (1990), pp. 181-192.
7. *Analogues of the MacDowell-Specker theorem in set theory*, in **Models, Algebras and Proofs,** edited by X. Caicedo and C.H. Montenegro, Marcel Dekker Inc., 1998. pp. 25-50.
8. *Delta as a continuous function of x and epsilon*, **The American Mathematical Monthly,** vol. 107, No. 2 (2000), pp. 151-155.
9. *Trees and Keisler's problem*, **Archive for Mathematical Logic**, vol. 40 (2001), pp. 273-276.
10. *Powerlike models of set theory*, **Journal of Symbolic Logic**, vol. 66, (2001), pp. 1766-1782.
11. *Counting models of set theory*, **Fundamenta Mathematicae**, vol.174 (2002) pp. 23-47.
12. *Automorphisms, Mahlo cardinals, and NFU*, in **Nonstandard Models of Arithmetic and Set Theory,** edited by A. Enayat & R. Kossak, Contemporary Mathematics, vol. 361, AMS Publications, Providence, Rhode Island, 2004, pp. 37-59.

13. *The Leibniz-Mycielski axiom in set theory*, **Fundamenta Mathematicae**, vol. 181 (2004)*, pp.215-231.

14. *Leibnizian models of set theory*, **Journal of Symbolic Logic**, vol. 69 (2004), pp. 775-789.

15. *Models of set Theory with definable ordinals,* **Archive for Mathematical Logic,** vol. 44 (2005), pp. 363-385.

16. *From bounded to second order arithmetic via automorphisms*, in **Logic in Tehran,** ed.by A. Enayat, I. Kalantari, & M. Moniri, ASL Lectures Notes in Logic, vol. 26, 2006, pp.87-113.

17. *Automorphisms of models of bounded arithmetic*, **Fundamenta Mathematicae,** vol. 192 (2006), pp. 37-65.

18. *Automorphisms of models of arithmetic: a unified view,* **Annals of Pure and Applied Logic,** vol.145, (2007), pp. 16-36.

19. *Model Theory of the regularity and reflection schemes* [with S. Mohsenipour]*,* **Archive for Mathematical Logic,** vol. 47 (2008), pp. 447-464.

20. *A standard model of Peano arithmetic with no conservative elementary extension*, **Annals of Pure and Applied Logic**, vol. 156 (2008), pp. 308-318

21. *ω-models of finite set theory* [with J. Schmerl and A.Visser], Lecture Notes in Logic vol. 36, Cambridge University Press, 2011, pp. 43-65.

22. *An improper arithmetically closed Borel subalgebra of P*(ω) *mod FIN* [with S. Shelah]*,* **Topology and Its Applications**, vol. 158, 2011, pp. 2495-2502.

23. *A new proof of Tanaka's theorem,* in **New Studies in Weak Arithmetics**, edited by P. Cégielski, C. Cornaros, & C. Dimitracopoulos, CSLI Lectures Notes, No. 211, 2014, pp. 93-102.

24. *Standard models of arithmetic,* **Idées Fixes**, edited by M**.** Kaså, University of Gothenburg Publications, 2014, pp. 55-64.

25. *New constructions of satisfaction classes* [with A. Visser], **Unifying the Philosophy of Truth**, edited by D. Achourioti, H. Galinon, K. Fujimoto, & J. Martinez Fernández, Springer, 2015, pp. 321-335.

26. *Variations on a Visserian theme,* **Liber Amicorum Alberti**, **a Tribute to Albert Visser**, edited by J. van Eijk, R. Iemhoff, & J. Joosten, College Publications, London, 2016, pp. 99-110.

27. *Marginalia on a theorem of Woodin* [with R. Blanck], **Journal of Symbolic Logic**, vol. 82, (2017), pp. 359-374.

28. *Feferman's forays into the foundations of category theory* [with P. Gorbow & Z. McKenzie], in **Feferman on Foundations: Logic, Mathematics, Philosophy**, Outstanding Contributions to Logic Series, edited by W. Sieg & G. Jaeger, Springer Publications, 2017.

29. *Unifying the model theory of first order and second order arithmetic via WKL$_0^*$* [with T. L. Wong], **Annals of Pure and Applied Logic**, vol. 30 (2017), pp. 1247-1283.

30. *Largest initial segments pointwise fixed by automorphisms of models of set theory* [with M. Kaufmann & Z. McKenzie], **Archive for Mathematical Logic,** vol. 57, pp. 91-139, 2018.

31. *Iterated ultrapowers for the masses* [with M. Kaufmann & Z. McKenzie], **Archive for Mathematical Logic**, (2018), vol. 57, pp 557-576.

32. *ZFC proves that Ord is not weakly compact for definable classes* [with J. D. Hamkins], **Journal of Symbolic Logic**, vol. 83 (2018), pp. 146-164.

33. *Fixed-point sets of self-embeddings of models of arithmetic* [with S. Bahrami], **Annals of Pure and Applied Logic**, vol. 169 (2018), pp. 487-513.

34. *Truth, Disjunction, and Induction* [with F. Pakhomov], **Archive for Mathematical Logic**, vol. 58 (2019), pp. 753–766.

35. *Truth and feasible reducibility* [with M. Łełyk and B. Wcisło], **Journal of Symbolic Logic**, vol. 85 (2020), pp. 367-421.
36. *An unpublished theorem of Solovay on OD partitions of Sacks reals into two non-OD parts, revisited* [with V. Kanovei]*,* **Journal of Mathematical Logic** (2020).
37. *The Barwise-Schlipf Theorem* [with J. H. Schmerl]*,* **Proceedings of American Mathematical Society,** vol.149 (2021), pp. 413-416.
38. *Topological models of arithmetic* [with J.D. Hamkins and B. Wcisło], **Fundamenta Mathematicae**, 2021**.**
39. *Condensable models of set theory,* **Archive for Mathematical Logic**, 2021.
40. *Initial self-embeddings of models of set theory* [with Z. McKenzie], **Journal of Symbolic Logic,** vol. 86 (2021), pp. 1584-1611.
41. *On effectively indiscernible projective sets and the Leibniz-Mycielski.axiom* [with V. Kanovei and V. Lyubetsky], **Mathematics** (Open Access Journal from MDPI), 2021.
42. *End extending models of set theory via power admissible covers* [with Z. McKenzie], **Annals of Pure and Applied Logic**, vol. 173 (2022), pp. 103-132.
43. *Set theory with a proper class of indiscernibles*, **Fundamenta Mathematicae**, vol. 259 (2022), pp. 33-76.
44. *Set theoretical analogues of the Barwise-Schlipf Theorem*, **Annals of Pure and Applied Logic**, vol. 173, Paper No. 103158, 16 pages, 2022.
45. *Axiomatizations of Peano Arithmetic: a truth-theoretic view* [with M. Łełyk], **Journal of Symbolic Logic**, vol. 88, pp. 1526-1555, 2023.
46. *Indiscernibles and satisfaction classes in arithmetic,* **Archive for Mathematical Logic***, available* [here](#).

ARTICLES UNDER REVIEW

- *Curious satisfaction classes*, [arXiv:2308.07463](#)
- *Incompleteness of boundedly axiomatizable theories* [with A. Visser], [arXiv:2311.14025](#)
- *Categoricity-like properties in the first-order realm* [with M. Łełyk] ; available [here](#).

EDITED COLLECTIONS

- **Nonstandard Models of Arithmetic and Set Theory**, Proceedings of the AMS special session on *Nonstandard Models* (Baltimore, 2003), edited by A. Enayat and R. Kossak, Contemporary Mathematics, volume 361, American Mathematical Society Publications, 2004.
- **Logic in Tehran,** Proceedings of the Tehran Logic Conference (October 2003), edited by A. Enayat, I. Kalantari, and M. Moniri, Association for Symbolic Logic and A.K. Peters, 2006.
- **March 2010 Issue of Annals of Pure and Applied Logic,** Proceedings of the IPM 2007 Conference, edited by A. Enayat and I. Kalantari.
- **Studies in Weak Arithmetics 3,** Proceedings of JAF33 (Gothenburg) & JAF34 (New York), edited by P. Cégielski, A. Enayat, and R. Kossak, CSLI Publications, Palo Alto, 2016.
- **February 2018 Issue of the Archive for Mathematical Logic,** Proceedings of the IPM Conference on Set Theory and Model Theory, (12-16 October 2015), edited by A. Enayat, M. Pourmahdian, & R. Schindler.
- **January 2024 Issue of Annals of Pure and Applied Logic** (Kunen issue), edited by A. Enayat, H. J. Keisler, D. Raghavan, F. Tall, A. Villaveces.

SELECTED CONFERENCE/WORKSHOP ORGANIZATION

- Chair of the organizing committee for *the 33rd Meeting of JAF* (Journées sur les Arithmétiques Faibles), **University of Gothenburg**, 16-18 June 2014.
- Member of the program committee for the 9th *Scandinavian Logic Symposium*, **Tampere, Finland**, 25-27 August 2015.
- Co-Chair of the organizing committee for *the IPM Conference on Set Theory and Model Theory*, IPM Research Center, **Tehran, Iran**, 12-16 October 2015.
- Member of the organizing committee for the *Scandinavian Summer School in Logic*, **Stockholm**, **Sweden**, 7-11 August 2017.
- Member of the program committee for the *European Logic Colloquium,* **Stockholm, Sweden**, 14-20 August 2017.
- Co-chair of the program & organizing committee for *the 10th Scandinavian Logic Symposium*, **University of Gothenburg**, 11-13 June 2018.
- Co-organizer of the Gothenburg-Warsaw Workshop on Truth, **Gothenburg, Sweden**, 6 December, 2018.
- Member of the scientific committee of the 52nd Annual Iranian Mathematics Conference, 30 August - 2 September 2021, **Kerman, Iran**.

CURRENT EDITORIAL RESPONSIBILITIES

- Associate Editor of *Bulletin of the Iranian Mathematical Society* (Published by Springer).
- Editor of *Bulletin of Symbolic Logic* (Published by Cambridge University Press).

DOCTORAL SUPERVISION

- Amir Togha, *On Automorphisms of Structures in Logic and Orderability of Groups in Topology*, Ph.D. awarded by **George Washington University** (USA), 2004.
- Shahram Mohsenipour, *Elementary End Extensions in Model Theory and Set Theory*, Ph.D. awarded by the I**nstitute for Theoretical Physics and Mathematics** (Iran), 2005.
- Rasmus Blanck, *Contributions to the Metamathematics of Arithmetic: Fixed Points, Independence, and Flexibility*, Ph.D. awarded by the **University of Gothenburg** (Sweden), 2017.
- Paul K. Gorbow, *Self-similarity in the Foundations*, Ph.D. awarded by the **University of Gothenburg** (Sweden), 2018.
- Saeideh Bahrami, *Self-embeddings of Models of Peano Arithmetic*, Ph.D. awarded by **Tarbiat Modares University** (Iran), 2018.

DOCTORAL THESIS EXAMINER

- Jennifer Chubb, *Ordered structures and computability*, Dept of Mathematics., **George Washington University**, USA, May 2009.
- Zachiri McKenize, *Automorphisms of models of set theory and extensions of NFU*, Faculty of Mathematics, **Cambridge University,** Great Britain**,** November 2012.
- Vassilis Paschalis, *End extensions of models of arithmetic*, **University of Athens**, Greece, June 2016.
- Mateusz Łełyk, *Axiomatic Theories of Truth, Bounded Induction and Reflection Principles***,** Faculty of Philosophy, **University of Warsaw**, Poland, October 2017.
- Juvenal Murwanashyaka, *Papers on Weak First-Order Theories and Decidability Problems*, Dept. of Mathematics, **Oslo University**, Norway, August 2023.

CONFERENCE/ WORKSHOP/SEMINAR LECTURES SINCE 2013

- *Model theory of arithmetic* (4 lectures), **Scandinavian Spring School**, Nordfjordeid, Norway, 27-31 May 2013.
- *Self-embeddings of models of arithmetic* (2 lectures), **JAF 32**, University of Athens, Greece, 24-25 June 2013.
- *Mathematics meets poetry: Omar Khayyam*, **Sy Friedman's Birthday Conference**, Kurt Gödel Research Center, Vienna, Austria, 8 July 2013.
- *A New Proof of Tanaka's Theorem*, **Proof Theory Day in Lisbon**, University of Lisbon, Lisbon, Portugal, 16 July 2013.
- *Borel models of arithmetic and set theory*, **European Set Theory Conference**, Barcelona, Spain, 19 July 2013.
- *Variations on a theme by Friedman,* **Harvey Friedman's Honorary Doctorate Ceremony,** Ghent University, Ghent, Belgium, 5 September, 2013.
- *What can we gain from satisfaction predicates?* **Seminar in Mathematical Logic and its Applications**, Shahid Beheshti University, Tehran, Iran, 18 December 2013.
- *Interpretations and mathematical logic*, **Frontiers of Mathematics 2**, Sharif University, Tehran, Iran, 25 December 2013.
- *Tarskian satisfaction classes*, *revisited*, **Logic Seminar**, Stanford University, USA, 17 March 2014.
- *Tarskian satisfaction classes*, *revisited*, **Proof Theory, Modal Logic, and Reflection Principles**, Instituto Tecnológico Autónomo de México (ITAM), Mexico City, Mexico, 1 October 2014.
- *Flexible Turing machines*, **Frontiers of Mathematics 3**, IPM, Tehran, Iran, 25 December 2014.
- *Interpretations: a logician's report*, **Gothenburg Philosophical Association**, 6 January 2015.
- *Flexible Turing machines*, **Logic Colloquium**, Kurt Gödel Research Center, Vienna, Austria, 7 May 2015.
- *Visser's categorical lens*, **Albert Visser Meeting**, Utrecht University, Utrecht, the Netherlands, 22 April 2016.
- *Playing with fire: interpreting PA with a full satisfaction predicate within PA,* **JAF 35**, University of Lisbon, Portugal, 6 May 2016.

- *Compositional truth: conservativity, interpretability, and feasibility*, **Workshop on Formal Truth Theories**, University of Warsaw, Poland, 30 September, 2017.
- *The Tarski boundary: a cartographic report*, **Philosophy and Logic. In honor of Cezary Cieśliński,** University of Warsaw, 23 March 2019.
- *Feasible reducibility and interpretability of truth theories*, **16th International Congress on Logic, Methodology and Philosophy of Science and Technology**, Prague, 9 August, 2019.
- *Some recent news about truth theories*, **Logic Colloquium '19**, Prague, 15 August, 2019.
- *The Barwise-Schlipf characterization of recursively saturated models of Peano Arithmetic, redux*, **Annual Conference of the Iranian Association for Logic** (online meeting), 17 February, 2021.
- *Surrounding the solidity of* PA *and* Z_2, Special Session on Models of Peano Arithmetic, **Annual Meeting of the Association for Symbolic Logic,** Ithaca, April 9, 2022.
- *Leibnizian themes in the foundations of mathematics*, **Munich-Warsaw Workshop**, Munich Center for Mathematical Philosophy, June 30, 2023.
- *Satisfaction classes, truth theories, and nonstandard models of arithmetic*, **British Logic Colloquium**, Bristol, September 9, 2023.
- *Indiscernibles and satisfaction classes*, **JAF 42**, Karlovassi, Greece, September 27, 2023.
- *Satisfaction classes, truth theories, and nonstandard models of arithmetic*, **British Logic Coloquium,** Bristol, September 9, 2023.
- *Categoricity-like features of first order foundational theories*, **Leeds Logic Seminar**, November 29, 2023.
- *Categoricity-like features in the first order realm*, **Oxford Philosophy of Mathematics Seminar**, January 22, 2024.

ONLINE PRESENTATIONS

- *Arithmetic and set theory through the lens of interpretability*, **Nordic Online Logic Seminar**, 27 March 2023.
- *Solidity, tightness, and internal categoricity,* **Models of Peano Arithmetic Seminar**, CUNY, New York, 25 October and 1 November, 2022.
- *Tight Theories*, Online International Workshop on Gödel's Incompleteness Theorems, **School of Philosophy of Wuhan University,** August 17, 2021.
- *The Barwise-Schlipf Theorem*, **Models of Peano Arithmetic Seminar**, CUNY, New York, 29 April and 6 May, 2020.
- *Recursively saturated models of set theory and their close relatives*, **Set Theory Seminar**, CUNY, New York, 15 May and 22 May, 2021.
- *Leibnizian motifs in set theory*, **Set Theory Seminar**, Oxford Univ., 27 May, 2021
- *Set theory with a class of indiscernibles*, **Logic Seminar**, Steklov Inst., 12 October, 2020.
- *Schemes and truth*, **Epistemic Commitments Seminar**, Univ. of Warsaw, 8 January, 2021.
- *Formal theories of truth* (4 lectures) , **First Iranian Spring Logic School**, Iranian Logic Society, 17-21 June, 2021.
- *Flexible Turing Machines*, Online Lecture Series on Logic and Foundations of Mathematics, **School of Philosophy of Wuhan University,** June 15, 2021.

SUMMARY OF TEACHING EXPERIENCE

A. **COURSES TAUGHT AT AMERICAN UNIVERSITY, DEPT. OF MATHEMATICS, 1987-2012.**

- **Elementary Courses**: Finite Mathematics,Single and Multivariable Calculus, Advanced Calculus, Linear Algebra, Differential Equations.
- **Advanced Courses**: Foundations of Mathematics, Mathematical Logic, Automata Theory, Set Theory, Group Theory, Rings and Fields, Combinatorics, Real Analysis, Topology, Measure Theory.
- **Supervision of reading courses for advanced undergraduates and graduate students in the following topics**: Model Theory, Ramsey Theory, Modal Logic, Foundations of Nonstandard Analysis, Modern Geometry, Algebraic Coding Theory, Algorithmic Graph Theory, Transcendental Number Theory, Laws of Large Numbers, Philosophy of Mathematics, Greek Mathematical Philosophy.
- **Master Theses Supervised, 15 in total, with the following titles:** Models of Arithmetic, Ultraproducts with Applications, Transcendental Numbers, Laws of Large Numbers, Continuous Selections, Nonstandard Analysis and the Loeb Measure, Relativity Theory, The Topology of Fractals and Topology, Combinatorial Number Theory, The Probabilistic Method, Music and Number Theory, Ramsey Theory, Gödel's Incompleteness Theorem, Algebraic Coding Theory. 1994.

B. **UNIVERSITY OF GOTHENBURG, DEPT. OF PHILOSOPHY, 2013-2020.**

- **Courses:** Introduction to Formal Logic, Computability Theory and Incompleteness, Set Theory.
- **Supervision of reading courses for doctoral students in the following topics:** Model Theory, Axiomatic Theories of Truth, Forcing in Arithmetic and Set Theory.

C. **UNIVERSITY OF WARSAW, DEPT. OF PHILOSOPHY, Winter 2021-2022.**

- **Course:** Canonical Models of Set Theory.