

# Laura Nenzi

## Curriculum Vitae

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### Personal Information

Date of Birth December 10, 1984  
Citizenship Italian  
Languages Italian (mothertongue), English (fluent), German (basic)

### Academic Appointments

- Nov. 2021 - **Assistant Professor (tenure-track)**, *Department of Engineering and Architecture*, University of Trieste, Italy.
- Sept. 2019 - **Assistant Professor (part-time)**, *Department of Mathematics and Geoscience*,  
Nov. 2021 University of Trieste, Italy.
- Aug. 2019 - **Project Assistant (part-time)**, *Faculty of informatics, Institute of Computer En-*  
Nov. 2021 *gineering*, Vienna University of Technology, Austria.
- Nov. 2018 - **Assistant Professor**, *Department of Mathematics and Geoscience*, University of  
Jul 2019 Trieste, Italy.
- Jun. 2017- **Project Assistant**, *Faculty of informatics, Institute of Computer Engineering*, Vienna  
Dec. 2018 University of Technology, Austria.
- Sept. 2016- **Research collaborator**, *System Modelling and Analysis Group*, IMT School of  
Jun. 2017 Advanced Studies Lucca, Italy.

### Qualification

- 2022 **Scientific National Italian Habilitation (10/06/2022) as Associate Professor in Computer Engineering**, granted by the Italian Ministry of Education, Universities and Research, sc 09/H1 "Ingegneria Informatica" - ssd ING-INF/05 "Sistemi di elaborazione delle informazioni".

### Education

- 2013-2016 **PhD in Computer Science (XVIII Cycle)**, *IMT School of Advanced Studies Lucca, Italy*, Thesis: "A logic-based approach to specify and design spatio-temporal behaviours of complex system", **Marks: Excellent.**

- 2010-2012 **Master Degree in Mathematics**, *University of Trieste, Italy*, Thesis: "A logic-based approach to determine the connection between biological modules and their behavioral properties", *Marks: 110/110*.
- 2006-2010 **Bachelor Degree in Mathematics**, *University of Padova, Italy*, Thesis: Biomechanical models for pattern formation.
- 2003-2006 **Bachelor Degree in Biotechnology**, *University of Padova, Italy*, Thesis: Adult stem cells in the tissue engineering: epithelium reconstruction..

## Visiting Positions

- 2014-2015 **Research visit (7 months) in the MoSi (Modelling and Simulation) group, at the Saarland University**, Saarbrücken, Germany.
- 2012 **Research visit (3 months) in the PEPA (Performance Evaluation Process Algebra) group, at the School of Informatics, University of Edinburgh**, Edinburgh, United Kingdom.

## Honors & Awards

- 2020 **Winner of the 2020 Hedy Lamarr Award of the City of Vienna (10 k Euro) for innovative achievements in IT**, Austria.
- 2018 **Winner of "procedura selettiva, D.R. n. 938, prot. n. 50407, per l'assunzione di un ricercatore a tempo determinato, tipologia a)"**, Trieste, Italy.
- 2018 **Invited to the final interview for the MRC/UoE Cross-Disciplinary Post-Doctoral Fellowship (XDF)**, Edinburgh, United Kingdom.

## Projects and Grants

### Principal Investigator

- Aug. 2019-Nov. 2021 **High-dimensional statistical learning: new methods to advance economic and sustainability policies (Total Funding ~2 Mio Euro, ~400 k Euro to TU Wien)**, *Funded by Austrian FWF within the YIRG programme, Project Leader for TU Wien*.
- 2017-2018 **Christiana HÖRBIGER Preis**, *grant by the TU Wien for the promotion of international mobility of young scientists.* .
- 2017 **STSM: Short Term Scientific Mission**, *grant by the COST Action IC1402 to collaborate with the University of Trieste on Monitoring of mobile and spatially distributed Cyber-Physical Systems..*

### Member

- Dec. 2022- **iNEST - Interconnected Nord-Est Innovation Ecosystem**, *Spoke 9, PNRR , vice-coordinatore dell'RT3*.
- March 2022 **Progetto Transform4Europe**, *T4E, WP3 T3.3 , MA programme in Digital Transformation meeting .*

- Nov. 2018- **Cyber-Physical Safety: coexistence of humans and robots (Total Funding ~150 k Euro)**, *Funded by Programma Triennale MIUR 2016-2018.*
- 2017-2018 **RISE: Rigorous Systems Engineering**, *member of the TU Wien unit.*
- 2013-2017 **EU FP7 QUANTICOL**, *member of the IMT Lucca unit..*

## Community Service

### Organisation of International Events

- 2022 **PC co-Chair of RV 2023**, *the 23rd International 22nd Intl. Conference on Runtime Verification, Thessaloniki, Greece.*
- 2022 **PC co-Chair of NSV 2022**, *the 15th International Workshop on Numerical Software Verification, Haifa, Israel.*
- 2021 **Publicity Chair of SEFM 2021**, *the 19th edition of the International Conference on Software Engineering and Formal Methods, Online.*
- 2020 **PC co-Chair of HSB 2020**, *the 7th International Workshop on Hybrid Systems and Biology, Vienna (on-line), Austria.*
- 2019 **PC co-Chair of the 1st Workshop on Spatio-Temporal Reasoning**, *at CDC 2019, Nice, France.*
- 2019 **Local Organisation co-Chair of CMSB 2019**, *the 17th International Conference on Computational Methods in Systems Biology, Trieste, Italy.*
- 2018 **Co-Organizer of AVM 2018**, *Alpine Verification Meeting , 24-27 September, Wagrain, Austria.*

### Program Committees

- 2021 **SEFM 2021, CMSB 2021, RV 2021, SEAMS 2021, VORTEX 2021, OVERLAY 21, ACOS 2021, NSV 21, VCLA Awards 2021.**
- 2020 **CMSB 2020, QEST 2020, RV 2020, VCLA Awards 2020.**
- 2019 **CMSB 2019, DataMod 2019, CSBio2019, CIBCB 2019, ICTCS 2019, HSB 2019.**
- 2018 **CMSB 2018, DataMod 2018, COMPUTATION TOOLS 2018.**
- 2017 **CILC 2017, DataMod 2017.**

### Award Committees

- 2020–2021 **Vienna Center for Logic and Algorithms International Student Awards.**

### PhD Examiner

- 2020 **Maria Sinziana Astefanoaei, Ph.D student at University of Edinburgh (Examiner of the VIVA)**, *Edinburgh, UK.*

### Responsibility in Doctoral Colleges

- 2019-Now **Associated Faculty Member of LogiCS DK, the Doctoral College in Logical Methods for Computer Science, Vienna, Austria .**  
<http://logic-cs.at/phd/faculty/>

2021-Now **Associated Faculty Member of SecInt, the Doctoral College for Secure and Intelligent Human-Centric Digital Technologies, Vienna, Austria.**  
<https://secint.visp.wien/program/>

#### Journal Editor

2021- **Editorial Board Member**, for *FoMaC (Foundations of Mastering Change)* track at *STTT (the International Journal on Software Tools for Technology Transfer)*. .

2020-2021 **Guest Editor**, for *TCS-C (Theory of Natural Computing)* for the Special Issue of *CMSB 2019*.

2020-2021 **Guest Editor**, for *Information and Computation* for the Special Issue of *HSB 2020*.

#### Journal Reviewer for

**Formal Methods in System Design, Theoretical Computer Science, Annals of Mathematics and Artificial Intelligence, SCICO (Science of Computer Programming), JSS (Journal of Systems and Software) , TAAS (Transaction on Autonompus and Adaptive Systems), IEEE Access..**

#### Subreviewer for

**CAV 2021, SIGSIM-PADS'19, ATVA 2019, SAC 2018, InfQ 2017, VALUE-TOOLS 2017, ALPA 2017, QEST 2017, ENASE 2017, ICTS 2016, QEST 2016, CONCUR 2016, HSCC 2016, RV 2015, FoCAS 2014. .**

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## Teaching

2021-2022 **Introduction to Artificial Intelligence**, 9 ECTS/CFU- Summer Semester, Bachelor Program in *Intelligenza Artificiale e Data Analytics*, University of Trieste, Italy.

2020-2021 **Engineering Cyber Physical Systems Advanced**, PhD course, Gran Sasso Science Institute (GSSI), Italy.

2019-2021 **Introduction to Logical Methods in Computer Science**, (PhD course), TU Wien, Austria.

2020-2022 **Cyber-Physical Systems**, 6 ECTS/CFU - Summer Semester, Master Program in *Data Science and Scientific Computing*, University of Trieste, Italy.

2018-2020 **Cyber-Physical Systems and Reinforcement Learning**, 6 ECTS/CFU - Summer Semester, together with Antonio Celani, Master Program in *Data Science and Scientific Computing*, University of Trieste, Italy.

2018-2019 **Laboratorio di Programmazione**, (3 ECTS/CFU - Summer Semester, together with Simone Silvetti), Bachelor Program in *Mathematics*.

2017 **Laboratorio di Programmazione**, (3 ECTS/CFU - Summer Semester, Bachelor Program in *Mathematics*.

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## Supervision

### (Co-)Supervision of PhD Students

2021-Now **Gaia Saveri**, PhD Nazionale in *Intelligenza Artificiale - area AI & Society* (Advisor: Luca Bortolussi, co-advisor: Laura Nenzi), Topic: *Explainable AI combining Logic and Statistical Learning, stochastic systems..*

### (Co-)Supervision of PhD Students

2020-Now **Ennio Visconti**, *PhD student in Computer Science (Advisor: Ezio Bartocci, co-advisor: Laura Nenzi), Topic: Formal Methods for large-scale, spatially-distributed, stochastic systems..*

#### (Co-)Supervision of Master Students

2021 **Patrick Indri**, *Topic: One-Shot Ensemble Learning for Anomaly Detection in Multivariate Time Series.*

2020 **Federico Pigozzi**, *Topic: Evolutionary Inference of Signal Temporal Logic Expressions for Ruling Real Road Traffic..*

2019 **Giuseppe Gallo**, *Topic: a behavioural kernel-based distance between stochastic models..*

#### (Co-)Supervision of Bachelor Students

2017 **Davide Prandini**, *Topic: Robust Monitoring of Imprecise Signals.*

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## Invited Talks

### Invited Talks at Conferences and Workshops

Oct. 6, 2020 **Invited tutorial at RV 2020: the 18th International Conference on Runtime Verification, Online.**

Title: *Monitoring Spatio-Temporal Properties*

Apr. 6, 2019 **Invited speakers at SynCoP 2019: the 6th Workshop on Synthesis of Complex Parameters, Prague, Poland.**

Title: *Parametric Verification and Synthesis based on Gaussian Processes*

### Other Talks

Feb. 13, 2019 **Talk at Dagstuhl Seminar(19071) on Specification Formalisms for Modern Cyber-Physical Systems, Dagstuhl, Germany.**

Title: *Expressive Spatio-Temporal Specifications for CPS*

Dec. 13, 2018 **Seminar at NII, National Institute of Informatics, in the Mathematical and Metamathematical Modelling Group, Hasuo-Lab, Tokyo, Japan.**

Title: *Specification formalisms and learning techniques for Cyber-Physical Systems*

Oct. 12, 2018 **Seminar at UC, University of California, in the group of Sanjit Seshia at the department of Electrical Engineering and Computer Science, Berkeley, USA.**

Title: *A Robust Genetic Algorithm for Learning Temporal Specifications from Data*

Oct. 10, 2018 **CS Colloquium at USC, University of Southern California, in the Viterbi School of Engineering, Los Angeles, USA.**

Title: *System Design of Stochastic Models using Robustness of Temporal Properties*

Jul. 04, 2018 **Seminar at the University of Camerino, Camerino, Italy.**

Title: *A Robust Genetic Algorithm for Learning Temporal Specifications from Data*

Dec. 15, 2017 **Seminar at Masaryk University, Brno, Czech Republic.**

Title: *System design of stochastic models using robustness of temporal properties*

Dec. 02, 2016 **Seminar at the PEPA club meeting, Informatics Forum, University of Edinburgh, Edinburgh, United Kingdom.**

Title: *A logic-based approach to specify and design spatio-temporal behaviours of complex systems*

Nov. 22, 2016 **Seminar at the University of Trieste, Trieste, Italy.**

Title: *Monitoring Spatio-Temporal Properties*

- Jan. 12, **Seminar at the University of Trieste**, Trieste, Italy.  
2016 Title: *Reinforcement Learning in Quantitative Formal Methods*
- May. 25, **Seminar at Saarland University**, Saarbrücken, Germany.  
2015 Title: *Qualitative and Quantitative Monitoring of Spatio-Temporal Properties*
- May. 28, **Seminar at ISTI**, Pisa, Italy.  
2013 Title: *A temporal logic approach to modular design of synthetic biological circuits*

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## List of Publications

### Journal Papers

1. Laura Nenzi, Ezio Bartocci, Luca Bortolussi, Simone Silveti, Michele Loreti: **MoonLight: A Lightweight Tool for Monitoring Spatio-Temporal Properties**, STTT, International Journal on Software Tools for Technology Transfer (To appear)
2. Laura Nenzi, Ezio Bartocci, Luca Bortolussi, Michele Loreti. **A Logic for Monitoring Dynamic Networks of Spatially-distributed Cyber-Physical Systems**, Log. Methods Comput. Sci. 18(1), 2022.
3. Federico Pigozzi, Eric Medvet, Laura Nenzi: **Mining Road Traffic Rules with Signal Temporal Logic and Grammar-based Genetic Programming**, Applied Sciences, Special Issue: Focus on Traffic Safety, Applied Sciences (Switzerland), 2021, 11(22), 10573
4. L. L. Vissat, M. Loreti, L. Nenzi, J. Hillston and G. Marion, **Analysis of spatio-temporal properties of stochastic systems using TSTL**, ACM Trans. Model. Comput. Simul. 29(4): 20:1-20:24 (2019)
5. L. Bortolussi, R. Lanciani, L. Nenzi, **Model checking Markov population models by stochastic approximations**, Information and Computation, vol. 262, pp. 189-220 (2018), DOI: 10.1016/j.ic.2018.09.004
6. L. Nenzi, L. Bortolussi, V. Ciancia, M. Loreti, M. Massink, **Qualitative and Quantitative Monitoring of Spatio-Temporal Properties with SSTL**, Logical Methods in Computer Science, vol. 14(4) (2018), DOI: 10.1016/j.ic.2018.09.004
7. E. Bartocci, L. Bortolussi, L. Nenzi, G. Sanguinetti, **System Design of Stochastic Models using Robustness of Temporal Properties**, Theoretical Computer Science, vol. 587, pp. 3-25 (2015), DOI: 10.23638/LMCS-14(4:2)2018

### Peer-Reviewed Conference and Workshop Papers

8. Ennio Visconti, Christos Tsigkanos, Laura Nenzi: **WebMonitor: Verification of Web User Interfaces**. ASE 2022 (To appear)
9. Patrick Indri, Alberto Bartoli, Eric Medvet, Laura Nenzi: **One-Shot Learning of Ensembles of Temporal Logic Formulas for Anomaly Detection in Cyber-Physical Systems**. EuroGP 2022: 34-50
10. Luca Bortolussi, Giuseppe Maria Gallo, Jan Kretínský, Laura Nenzi: **Learning Model Checking and the Kernel Trick for Signal Temporal Logic on Stochastic Processes**. TACAS (1) 2022: 281-300
11. Ennio Visconti, Ezio Bartocci, Michele Loreti, Laura Nenzi: **Online Monitoring of Spatio-Temporal Properties for Imprecise Signals**, MEMOCODE 2021.
12. Sara Mohammadinejad, Jyotirmoy V. Deshmukh, Laura Nenzi: **Mining Interpretable Spatio-Temporal Logic Properties for Spatially Distributed Systems**, ATVA 2021.
13. L. Nenzi, E. Bartocci, L. Bortolussi, M. Loreti, E. Visconti, **Monitoring Spatio-Temporal Properties (Invited Tutorial)**, RV 2020: 21-46
14. E. Bartocci, L. Bortolussi, M. Loreti, L. Nenzi, S. Silveti **MoonLight: A Lightweight Tool for Monitoring Spatio-Temporal Properties**, RV 2020: 417-428,
15. J. Lamp, S. Silveti, L. Nenzi, L. Feng, **A Logic-Based Learning Approach to Explore Diabetes Patient Behaviors**, CMSB 2019: The 17th International Conference on Computational Methods in Systems Biology,
16. C. Tsigkanos, L. Nenzi, M. Loreti, M. Garriga, S. Dustdar, C. Ghezzi, **Inferring Analyzable Models from Trajectories of Spatially-Distributed Internet of Things**, SEAMS 2019: The 14th International Symposium on Software Engineering for Adaptive and Self-Managing Systems,
17. S. Silveti, L. Nenzi, E. Bartocci, L. Bortolussi, **Signal Convolution Logic**, ATVA 2018: The

- 16th International Symposium on Automated Technology for Verification and Analysis, vol. 11138, pp. 267–283, Springer, LNCS, DOI: 10.1007/978-3-030-01090-4\_16
18. L. Nenzi, S. Silveti, E. Bartocci, L. Bortolussi, **A Robust Genetic Algorithm for Learning Temporal Specifications from Data**, QEST 2018: The 15th International Conference on Quantitative Evaluation of SysTems, vol. 11024, pp. 323–338, Springer, LNCS, DOI: 10.1007/978-3-319-99154-2\_20
  19. L. L. Vissat, J. Hillston, M. Loreti, L. Nenzi, **Automatic verification of reliability requirements of spatio-temporal analysis using Three-Valued Spatio-Temporal Logic**, VALUETOOLS 2017: The 11th EAI International Conference on Performance Evaluation Methodologies and Tools, pp. 74–79, ACM, DOI: 10.1145/3150928.3150961  
 . Bartocci, L. Bortolussi, M. Loreti, L. Nenzi, **Monitoring Mobile and Spatially Distributed Cyber-Physical Systems**, MEMOCODE 2017: The 15th ACM-IEEE International Conference on Formal Methods and Models for System Design, pp. 146–155, ACM, DOI: 10.1145/3127041.3127050
  20. L. L. Vissat, M. Loreti, L. Nenzi, J. Hillston and G. Marion, **Three-Valued Spatio-Temporal Logic: a further analysis on spatio-temporal properties of stochastic systems**, QEST 2017: The 14th International Conference on Quantitative Evaluation of SysTems, vol. 10503 pp. 317–332, Springer, LNCS, DOI: 10.1007/978-3-319-66335-7\_22
  21. L. Bortolussi, M. Loreti, L. Nenzi, **jSSTL - A Tool to Monitor Spatio-Temporal Properties**, VALUETOOLS 2016: The 10th EAI International Conference on Performance Evaluation Methodologies and Tools, pp. 74–79, ACM, DOI: 10.4108/eai.25-10-2016.2266978
  22. E. Bartocci, L. Bortolussi, L. Nenzi, D. Milios, G. Sanguinetti, **Studying Emergent Behaviours in Morphogenesis using Signal Spatio-Temporal Logic**, HSB 15: the 4th International Workshop on Hybrid Systems Biology, vol. 9271, pp. 156–172, 2015, Springer DOI: 10.1007/978-3-319-26916-0\_9  
 . Nenzi, L. Bortolussi, V. Ciancia, M. Loreti, M. Massink, **Qualitative and Quantitative Monitoring of Spatio-Temporal Properties with SSTL**, RV 15: The 15th International Conference on Runtime Verification, vol. 9333, pp. 21–3, 2015, Springer, LNCS DOI: 10.1007/978-3-319-26916-0\_9
  23. L. Bortolussi, L. Nenzi, **Specifying and monitoring properties of stochastic spatio-temporal systems in signal temporal logic**, VALUETOOLS 2014: The 8th International Conference on Performance Evaluation Methodologies and Tools, pp. 66–73, ACM, DOI: 10.4108/icst.valuetools.2014.258183
  24. E. Bartocci, L. Bortolussi, L. Nenzi, **A temporal logic approach to modular design of synthetic biological circuits**, CMSB 2013: The 11th International Conference on Computational Methods in Systems Biology, IST Austria, Klosterneuburg, Austria, September 23–25, 2013, LNCS 8130, pp. 164–178, Springer DOI: 10.1007/978-3-642-40708-6\_13
  25. E. Bartocci, L. Bortolussi, L. Nenzi, G. Sanguinetti, **On the Robustness of Temporal properties for Stochastic Models**, HSB 2013: The 2nd International Workshop on Hybrid Systems and Biology, September 2013, Taormina, Italy, 2013, EPTCS 125, pp. 3–19 DOI: 10.4204/EPTCS.125.1

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## Media coverage about me

- 2021 **Interview with TEDxVienna**, Hedy Lamarr Prize Laureate Laura nenzi on the human side of the technology , <https://magazine.tedxvienna.at/2021/01/02/laura-nenzi/>.
- 2020 **Zeitung, MINT-Mut statt Mimimi**, [https://www.falter.at/zeitung/20201125/mint-mut-statt-mimimi/\\_dbd20278e2](https://www.falter.at/zeitung/20201125/mint-mut-statt-mimimi/_dbd20278e2).
- 2020 **Der Standard, Informatikerin und Schauspielerin erhielt Hedy-Lamarr-Preis**, <https://www.derstandard.at/story/2000120529211/informatikerin-und-schauspielerin-erhielt-hedy-lamarr-preis>.

2020 **Wienerin**, *Hedy Lamarr Preis 2020: Forscherinnen gehören auf die Bühne!*  
<https://wienerin.at/hedy-lamarr-preis-2020-forscherinnen-gehoren-auf-die-buhne>