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## Faezeh Farivar

Assistant Professor

College: Mechanics, Electrical Power and Computer  
Faculty

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### PhD, Assistant Professor, IEEE Senior Member

Department of Computer and Mechatronics Engineering, School of Electrical and  
Computer Engineering  
Science and Research Branch, Azad University (IAU), Tehran, Iran

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Director of Advanced Networking and Security Research Lab. in Cyber Physical Systems  
([ANSLab.org](http://ANSLab.org))

Representative of IEEE Women in Engineering (IEEE-WIE) Committee, IEEE-IRAN Section

Email: f.farivar [at] srbiau.ac.ir

Tel: +98 21 4486 8536

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Google Scholar: [Link](#)

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#### RESEARCH INTERESTS

- Industrial Control Systems Security
  - Cyber Physical Systems (CPS)
  - CPS Security & Vehicular Security
  - Machine Learning & Intelligent Systems
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#### COURSES: Spring 2022

- Modeling and Identification of Cyber-Physical Systems, Postgraduate Course
  - Advanced Artificial Neural Networks, Postgraduate Course
  - Advanced Automatic Control, Postgraduate Course
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#### JOURNAL PUBLICATIONS

- F. Farivar, MS. Haghghi, A. Jolfaei, S. Wen, "[On the Security of Networked Control](#)

Systems in Smart Vehicle and its Adaptive Cruise Control”, **IEEE Transactions on Intelligent Transportation Systems**, DOI: [10.1109/TITS.2021.3053406](https://doi.org/10.1109/TITS.2021.3053406), 2021.

- F. Farivar, MS. Haghghi, A. Jolfaei, S. Wen, “Covert Attacks through Adversarial Learning: Studying the Effect of Lane Keeping Attacks on the Safety of Autonomous Vehicles”, **IEEE/ASME Transactions on Mechatronics**, DOI: [10.1109/TMECH.2021.3064816](https://doi.org/10.1109/TMECH.2021.3064816), 2021.
- F. Farivar, MS. Haghghi, A. Jolfaei, M. Alazab, “Artificial Intelligence for Detection, Estimation, and Compensation of Malicious Attacks in Nonlinear Cyber Physical Systems and Industrial IoT”, **IEEE Transactions on Industrial Informatics**, Vol. 4, pp. 2716-2725, 2020 (“Chancellor’s award for the best paper in engineering at the 8th IAU Scholars Festival, April 2021”) (Highly Cited Paper in WOS).
- MS. Sadeghi G., F. Farivar, MS. Haghghi, A. Jolfaei, “Detection of Anomalies in Industrial IoT Systems by Data Mining: Study of Christ Osmotron Water Purification System”, **IEEE Internet of Things Journal**, DOI: [10.1109/JIOT.2020.3034311](https://doi.org/10.1109/JIOT.2020.3034311), 2021.
- MS. Haghghi, A. Sheikhjafari, A. Jolfaei, F. Farivar, S. Ahmadzadeh, “Automation of Recording in Smart Classrooms via Deep Learning and Bayesian Maximum a Posteriori Estimation of Instructor’s Pose”, **IEEE Transactions on Industrial Informatics**, Vol. 17, Issue 4, pp. 2813 - 2820, 2021.
- MS. Haghghi, F. Farivar, “Stability Analysis of Networked Control Systems under Denial-of-Service Attacks using Switching System Theory”, **Journal of Information and Communication Technology**, Vol. 13, Issue 49, pp. 115 - 134, 2021.
- MS. Haghghi, F. Farivar, A. Jolfaei, MH. Tadayon, “Intelligent robust control for cyber-physical systems of rotary gantry type under denial of service attack”, **Journal of Supercomputing**, Vol. 76, pp. 3036-3085, 2020.
- N. Shahabi Sani, M. Manthouri, F. Farivar, “A Multi-Objective Ant Colony Optimization Algorithm for Community Detection in Complex Networks”, **Journal of Ambient Intelligence and Humanized Computing**, Vol. 11, pp. 5-21, 2020.
- F. Farivar, M. Aliyari Sh., M. Manthouri, “Improved Teaching-Learning based Optimization Algorithm using Lyapunov Stability Analysis”, **Journal of Ambient Intelligence and Humanized Computing**, DOI [10.1007/s12652-020-02012-z](https://doi.org/10.1007/s12652-020-02012-z), 2020.
- H.A. Ghiassirad, M. Aliyari Sh., F. Farivar, “Application of Constrained Learning in Making Deep Networks More Transparent, Regularized, and Biologically Plausible”, **Engineering Applications of Artificial Intelligence**, Vol. 85, pp. 421-428, 2019.
- H. Yektaei, M. Manthouri, F. Farivar, “Diagnosis of Breast Cancer Using Multi Scale Convolutional Neural Network”, **Biomedical Engineering: Applications, Basis and Communications**, Vol. 31, No. 5, 2019.
- F. Farivar, M. Aliyari Sh., “Stability Analysis of Particle Dynamics in Gravitational Search Optimization Algorithm”, **Information Sciences**, Vol. 337-338, pp. 25-43, 2016.
- F. Farivar, M. Nili Ahmadabadi, “Continuous Reinforcement Learning to Robust Fault Tolerant Control for a Class of Unknown Nonlinear Systems”, **Journal of Applied Soft Computing**, Vol.37, pp. 702-714, 2015.
- F. Farivar, M. Aliyari Sh., MA. Nekoui, M. Teshnehlab, “Synchronization of Under-Actuated Unknown Heavy Symmetric Chaotic Gyroscopes via Optimal Gaussian Radial Basis Adaptive Variable Structure Control”, **IEEE Transactions on Control Systems Technology**, Vol. 21, Issue 6, pp. 2374-2379, 2013.

- F. Farivar, M. Aliyari Sh., MA. Nekoui, M. Teshnehlab, "Chaos Control and Modified Projective Synchronization of Unknown Heavy Symmetric Chaotic Gyroscope Systems via Gaussian Radial Basis Adaptive Backstepping Control", *Journal of Nonlinear Dynamics (Springer)*, Vol.12, No.3, pp.1913-1941, 2012.
- F. Farivar, M. Aliyari Sh., "Fault Tolerant Synchronization of Chaotic Heavy Symmetric Gyroscope Systems versus External Disturbances via Lyapunov Rule-Based Fuzzy Control", *Journal of ISA Transaction*, Vol. 51, pp.50-64, 2012.
- F. Farivar, M. Aliyari Sh., MA. Nekoui, M. Teshnehlab, "Chaos Control and Generalized Projective Synchronization of Heavy Symmetric Chaotic Gyroscope Systems via Gaussian Radial Basis Adaptive Variable Structure Control", *Journal of Chaos, Solitons and Fractals*, Vol.45, pp.80-97, 2012.
- F. Farivar, M. Aliyari Sh., M. Teshnehlab, "An Interdisciplinary Overview and Intelligent Control of Human Prosthetic Eye Movements System for the Emotional Support by a Huggable Pet-Type Robot from a Biomechatronical View Point", *Journal of Franklin Institute*, Vol. 349, pp. 2243-2267, 2012.
- F. Farivar, M. Aliyari Sh., MA. Nekoui, M. Teshnehlab, "Generalized projective synchronization of uncertain chaotic systems with external disturbance", *Journal of Expert Systems with Applications*, Vol.38, pp.4714-4726, 2011.
- F. Farivar, M. Aliyari Sh., M. Teshnehlab, MA. Nekoui, "Modified Projective Synchronization of Unknown Chaotic Dissipative Gyroscope Systems via Gaussian Radial Basis Adaptive Variable Structure Control", *Journal of Vibration and Control*, Vol.19, No.4, pp.491-506, 2012.
- F. Farivar, MA. Nekoui, M. Aliyari Sh., M. Teshnehlab, "Modified Projective Synchronization of Chaotic Dissipative Gyroscope Systems via Backstepping Control", *Indian Journal of Physics (Springer)*, Vol.86 , 2012.
- F. Farivar, M. Aliyari Sh., MA. Nekoui, M. Teshnehlab, "Generalized Projective Synchronization for Chaotic Systems via Gaussian Radial Basis Adaptive Backstepping Control", *Journal of Chaos, Solitons and Fractals*, Vol.42, No.2, pp.826-839, 2009.
- F. Farivar, MA. Nekoui, M. Aliyari Sh., M. Teshnehlab, "Evolutionary Algorithms to Compute the Optimal Parameters of Gaussian Radial Basis Adaptive Backstepping Control for Chaotic Systems", *Universal Journal of Control and Automation*, Vol. 2, No. 1, pp. 25-31, 2014.
- M. Rostami K., **F. Farivar**, M. Aliyari Sh., "Control of Flexible Joint Manipulator via Variable Structure Rule-Based Fuzzy Control and Chaos Anti-Control with Experimental Validation", *Journal of Intelligence Systems in Electrical Engineering*, 4th year, No. 4, pp.1-12, 2014.
- F. Farivar, M. Aliyari Sh., MA. Nekoui, M. Teshnehlab, "Generalized Projective Synchronization of Chaotic Heavy Gyroscope Systems Via Sliding Rule-Based Fuzzy Control", *Journal of ISRN Artificial Intelligence*, doi:10.5402/2012/576873, Vol. 2012, Article ID 576873, pp.1-10, 2012.
- F. Farivar, M. Aliyari Sh., M. Teshnehlab, MA. Nekoui, "Chaos Control and Modified Projective Synchronization of Chaotic Dissipative Gyroscope Systems", *Journal of Energy and Power Engineering*, Vol.6, pp.90-100, 2012.
- M. Rostami K, **F. Farivar**, M. Aliyari Sh., "Lyapunov Based Control of Flexible Joint Manipulator with Experimental Validation by Using Chaotic Gyroscope

Synchronization", International Journal of Mechanic Systems Engineering, Vol.2, No.4, pp.169-175, 2012.

- A. Saedian, H. Zarabadipour, M. Aliyari Sh., **F. Farivar**, "Fault Tolerant Control of Mechatronics System based on Hybrid Control", International Journal of Physical Sciences, Vol. 7, No. 12, pp. 1949 - 1958, 2012.
- M. Zamani P., M. Aliyari Sh., **F. Farivar**, M. Rostami K., "Hybrid Concepts of the Control and Anti-Control of Flexible Joint Manipulator", International Journal of Robotics, Vol.2, No.1, 2011.
- F. Farivar, MA. Nekoui, M. Teshnehlab, M. Aliyari Sh., "Neural Sliding Mode Control for Chaos Synchronization of Uncertain Nonlinear Gyros", Journal of Advances and Applications in Mathematical Sciences, Mili publications, Vol.4, issue.1, pp.41-56, 2010.

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## CONFERENCE PROCEEDINGS

- F. Farivar, MS. Haghighi, S. Barchinezhad, A. Jolfaei, "[Detection and Compensation of Covert Service-Degrading Intrusions in Cyber Physical Systems through Intelligent Adaptive Control](#)", the **20th IEEE International Conference on Industrial Technology (ICIT)**, 2019.
- M. Salehi, **F. Farivar**, "State Feedback Control Design of Cars Wings in Order to Improve Road-Holding on Corners of Roads", **the 5th Conference on Knowledge-Based Engineering and Innovation (IEEE-KBEI)**, 2019.
- M. Salehi, M. Ahmadieh, **F. Farivar**, "Model of car wing active control in order to increase stability of car on corners of road", **IEEE-International Conference on Automatic Control and Dynamic Optimization Techniques (ICACDOT 2016)**, 2016.
- F. Farivar, "Fault Tolerant Synchronization for a Class of Uncertain Chaotic Systems with Model Uncertainty and External Disturbances Using Fuzzy Sliding Mode Control", **the 9th Asian Control Conference**, 2013.
- F. Farivar, H. Yaghini B., MH. Kani, M. J. Yazdanpanah, M. Nili Ahmadabadi, "Comparing Energy Efficiency of Hopping Systems with Linear and Piecewise Linear Spring", **the 15th International Conference on Climbing and Walking Robots (CLAWAR 2012)**, Johns Hopkins University, 2012.
- A. Saedian, H. Zarabadipour, M. Aliyari Sh., **F. Farivar**, "Inverted Pendulum Fault Tolerant Control Based on Fuzzy Backstepping Design and Anti-Control of Chaos", **the 3rd IFAC CHAOS Conference**, 2012.
- F. Farivar, M. Aliyari Sh., MA. Nekoui, M. Teshnehlab, "Chaos Synchronization for a Class of Chaotic Systems with Model Uncertainty and External Disturbances", **IEEE International Conference on Mechatronics**, 2011.
- F. Farivar, M. Aliyari Sh., "Fault Tolerant Synchronization of Chaotic Heavy Symmetric Gyroscope Systems via Gaussian RBF Neural Network Based on Sliding Mode Control", **IEEE International Conference on Mechatronics**, 2011.
- M. Rostami K., **F. Farivar**, M. Zamani P., M. Aliyari Sh., "Variable Structure Control and Anti-Control of Flexible Joint Manipulator with Experimental Validation", **IEEE International Conference on Mechatronics**, 2011.
- F. Farivar, M. Rostami K., M. Aliyari Sh., "Intelligent Control of Human Prosthetic Eye

Movements System for the Emotional Support by a Huggable Pet-Type Robot via Gaussian RBF Neural Network Based on Sliding Mode Control”, **the 2nd International Conference on Control, Instrumentation, and Automation**, IEEE Indexed, 2011.

- M. Zamani P., **F. Farivar**, M. Aliyari Sh., “Feedback Linearization and Chaotic Anti-Control of Flexible Joint Manipulator with Experimental Validation”, **the 2nd International Conference on Control, Instrumentation, and Automation**, IEEE Indexed, 2011.
- M. Rostami K., **F. Farivar**, H. Moradi, “A Tethered Aerial Robot for Rescue Operations: Dynamic Modeling and Control”, the 1st RSI/ISM International Conference on Robotics and Mechatronics (ICRoM), 2013.
- M. Rostami K., **F. Farivar**, M. Aliyari Sh., “Control and Anti-Control of Rotary Gantry via Gaussian Radial Basis Function Neural Networks by using Chaotic Gyroscope Synchronization”, **the Iranian Conference on Chaos, Fractals and Complex Systems (CFCS)**, 2011.
- N. Farzbod, H. Zarabadipour, M. Aliyari Sh., **F. Farivar**, “Sliding Adaptive Fuzzy Control for a Class of Time-Delayed Chaotic Systems”, **IEEE International Conference on Fuzzy systems**, 2011.
- N. Farzbod, H. Zarabadipour, M. Aliyari Sh., **F. Farivar**, “Generalized Projective Synchronization of Time-Delayed Chaotic Systems via Sliding Adaptive Fuzzy Control”, **IEEE International Conference on Fuzzy systems**, 2011.
- N. Farzbod, H. Zarabadipour, M. Aliyari Sh., **F. Farivar**, “Generalized Projective Synchronization of Time-Delayed Chaotic Systems via Sliding Adaptive Radial Basis Function Neural Network Control”, **the 19th Iranian Conference on Electrical Engineering**, 2011.
- F. Farivar, M. Aliyari Sh., MA. Nekoui, M. Teshnehlab, “Chaos Synchronization of Uncertain Nonlinear Gyros via Hybrid Control”, **IEEE/ASME International Conference on Advanced Intelligent Mechatronics**, 2009.
- F. Farivar, M. Aliyari Sh., MA. Nekoui, M. Teshnehlab, “Sliding Mode Control of Flexible Joint Using Gaussian Radial Basis Function Neural Networks”, **International Conference on Computer and Electrical Engineering**, 2008.

## Papers in Conferences

1. [F Farivar, S Barchinezhad, MS Haghighi, A Jolfaei ,Detection and Compensation of Covert Service-Degrading Intrusions in Cyber Physical Systems through Intelligent Adaptive Control ,The 20th IEEE International Conference on Industrial Technology ,Melbourne ,2019.](#)

## Thesis

1. [Robustness Analysis against Adversarial Machine Learning Attacks by using Biologically Inspired Binomial Neurons](#)
2. [Design and analysis of covert attacks in smart and autonomous vehicles](#)
3. [Designing an intrusion detection and compensation system for cyber physical systems using a state estimator and nonlinear control system](#)
4. [Fault Tolerant Control of Wind Turbine Systems using Classic-Intelligent Controllers](#)