

Curriculum Vitae

Reza Rafiee-Dehkharghani

Affiliation:

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EDUCATION

- **Ph.D.** in Computational Mechanics
University at Buffalo, State University of New York, Buffalo, USA, 2015
Major Advisor: Professor A. J. Aref
Co-advisor: Professor G. F. Dargush
- **M.S.** in Computational Mechanics (Course-Based Master's degree)
University at Buffalo, State University of New York, Buffalo, USA, 2011
- **M.S.** in Geotechnical Engineering
University of Tehran, Tehran, IRAN, 2009
- **B.S.** in Civil Engineering
University of Tehran, Tehran, IRAN, 2006

RESEARCH SUMMARY

Dr. Rafiee conducts research in Computational Mechanics related to the real-world problems within the field of Geotechnical Engineering, Earthquake Engineering, and Engineering Mechanics/Dynamics.

Dr. Rafiee has recently worked on the following research topics:

- Design of wave barriers for mitigation of horizontal and vertical seismic waves
- Design of wave barriers for mitigation of train-induced vibrations
- Analytical and numerical simulation of the behavior of stone-columns
- Topology Optimization for design of wave barriers
- Dynamic behavior of single and group piles
- Wave propagation in porous materials

- Using metamaterials and periodic structures for wave mitigation
- Analytical/Numerical wave-based approach for wave propagation analysis of complex engineering systems.

AWARDS

- “*CSEE Chair’s Recognition Graduate Award, 2014*”. Awarded by Department of Civil, Structural, and Environmental Engineering, SUNY, University at Buffalo.
- *Dr. Kazemi-Ashtiani’s Award (Amount: 200 million Iranian Rials), 2017*. Awarded by National Elites Foundation, Presidency of Islamic Republic of Iran.
- Teaching award in *8th EDUCATIONAL FESTIVAL*, University of Tehran, 2021

RESEARCH GRANTS:

1. "A new analytical-numerical approach for continuous stress wave propagation modeling in complex engineering systems/structures"
PIs: Dr. Reza Rafiee-Dehkharghani and Dr. Mahdi Samadzad
Sponsor: Iran National Science Foundation (INSF), 2017-2019
 Effort: 50%
2. "Evaluation of the performance of Tehran’s highways’ medians considering with the focus on the landscaping design, drainage, and vehicle collision"
PIs: Dr. Reza Rafiee-Dehkharghani Dr. Mahdi Samadzad, and Dr. Keyvan Aghabeyk
Sponsor: Deputy of Technical and Development Affairs – Tehran Municipality, 2017-2018
 Effort: 33.33%
3. "Evaluation and mitigation of underground train-induced vibrations using wave barriers".
PIs: Dr. Reza Rafiee-Dehkharghani
Sponsor: Aab-Niroo Company, Ministry of Energy, 2021
 Effort: 100%

COURSES TAUGHT:

Undergraduate Courses:

1. Engineering Mechanics – Dynamics (University of Tehran)
 Fall 2016 to Fall 2020 (once per year)
2. Soil Mechanics Laboratory (University of Tehran)
 Fall 2016 to Fall 2020 (twice per year)
3. English for Civil Engineers (University of Tehran)
 Spring 2019, Spring 2020, Spring 2021

4. Ground Improvement (University of Tehran)
Spring 2018 and 2019
5. Engineering Mechanics – Statics (University at Buffalo)
Fall 2013
6. Structural Analysis I (University at Buffalo)
Summer 2014

Graduate Courses:

- Advanced Engineering Mathematics (University of Tehran)
Fall 2015 to Fall 2020 (once per year)
- Numerical Methods in Geotechnical Engineering (University of Tehran)
Spring 2019, Spring 2020, Spring 2021
- Mechanics of Porous Media (University of Tehran)
Spring 2020, Spring 2021
- Advanced Foundation Engineering (Islamic Azad University)
Fall 2015, Spring and Fall 2016, Spring and Fall 2017, Spring 2018-01-08
- Finite Element Method (Islamic Azad University)
Spring and Fall 2015, Spring 2016

RESEARCH SUPERVISION:

PhD Students as an Advisor:

1. Mohammad Bahrami, "TBD", 2019-Present
2. Soroush Khodaverdian, "TBD", 2020-Present
3. Zahra Najafi, "TBD", 2020-Present

MSc Students as an Advisor:

1. Amir Rezaie, "Soil-buried wave barriers for vibration control of structures subjected to vertically incident shear waves", 2016-2017
2. Farbod Yarmohammdi, "Mitigation of ground vibrations caused by train-generated surface waves using wave barriers", 2016-2018
3. Majid Zakerinia, "Effects of geometric and mechanical parameters on the behavior of stone-columns- numerical investigation", 2016-2017
4. Ali Farahani, "A new analytical-numerical continuous wave-based approach for analyzing dynamic behavior of single and group piles", 2017-2019
5. Mohammad Eskandari-Ghadi, "Topology optimization of wave barriers for mitigation of rotary machine-induced ground vibrations", 2017-2019

6. Faezeh Hashemi, "Optimal design of stone columns", 2018-2019
7. Arash Ebrahimkhanloo, "Optimal design of metamaterials for SHM applications", 2017-2020
8. Sina Sadeghi, "Investigation of ground vibrations induced by underground trains and proposing an optimal design procedure for mitigating these vibrations using wave barriers", 2019 – 2021
9. Farzaneh Abedini, "Mitigation of low frequency vibrations induced by construction activities using topology optimization of soft and stiff wave barrier", 2019-2021
10. Alireza Esmaili, "Wave barriers for attenuation of ground vibrations by considering the effects of loading frequency and pore pressure", 2019-2021
11. Sajjad Aldavood, "An analytical-numerical wave-based continuous approach for investigation of wave propagation in high-rise buildings", 2019-Present
12. Katayoun Shahbazi, "Low-frequency wide band-gap metastructures in soil for mitigating seismic-induced vibrations", 2019-Present
13. Shahab Amanat, " Design of finite/infinite periodic metamaterials for surface wave attenuation in continuous media using Bloch wave concept", 2019-2021
14. Koorosh Gholami, "Design of wave barriers for surface wave attenuation in saturated porous media using unit cell concept in solid state physics", 2019-Present
15. Mohammad Amin Dargi, "A 2.5-dimensional finite element model for predicting the vibrations in a half-space saturated multi-layered porous medium subjected to moving loads", 2019-Present
16. Davood Salehi, "Optimal design and soil-structure interaction modeling of irregular bridges using genetic algorithm", 2019-Present
17. Arman Mahzoon, "TBD", 2020-Present
18. Hasti Eghbali, "TBD", 2020-Present
19. Zahra Shahrabi Farhani, "TBD", 2020-Present

MSc Students as a Co-Advisor:

1. Reza Zamani, "Numerical evaluation of capability of spectral analysis method for laminar damage detection in structures", 2015-2016
2. Sadyar Sarraf "Isolation system for mitigation of horizontal seismic waves effects", 2016-2018
3. Samyar Sarraf "Isolation system for mitigation of vertical seismic waves effects", 2016-2018

4. Farnood Farsijani, "Study on seismic performance of steel frames having in plan non-straight beams", 2016-2018
5. Marzieh Shahraki, "Comparison between the operation of stone-columns and other soil improvement methods", 2015-2017

PUBLICATIONS:

Journal Papers:

1. Fuhrman, D., **Rafiee-Dehkharghani, R.**, Lopez, M. M., Aref, A. J., O'connor, J. "Field Performance of a New Fiber Reinforced Polymer Deck", ASCE Journal of Performance of Constructed Facilities, 2014. 29(6): p. 04014162.
2. **Rafiee-Dehkharghani, R.**, Aref, A. J., Dargush, G. F. "Characterization of multi-layered stress wave attenuators subjected to impulsive transient loadings", ASCE Journal of Engineering Mechanics, 2014. 141(4): p. 04014137.
3. **Rafiee-Dehkharghani, R.**, Aref, A. J., Dargush, G. F. "Planar stress wave attenuation in plates with circular voids and inclusions", Composites Part B, 2015. 75: p. 307-318
4. **Rafiee-Dehkharghani, R.**, Bansal, D., Aref, A. J., Dargush, G. F. "Interface profile optimization for planar stress wave attenuation in bi-layered plates", Composites Part B, 2015. 82: p. 129-142.
5. **Rafiee-Dehkharghani, R.**, Aref, A. J., Dargush, G. F. "Stress wave attenuation in non-collinear structures subjected to impulsive transient loadings", ASCE Journal of Engineering Mechanics, 2016. 142(5): p. 04016014
6. **Rafiee-Dehkharghani, R.**, Bansal, D., Aref, A. J., Dargush, G. F. "Analysis and Optimal Design of Stress Wave Intensity Attenuation in Layered Structures", International Journal of Structural Stability and Dynamics, 2017. 18(1), 18500115.
7. Dolatshahi, K.M., Rezaie, A., **Rafiee-Dehkharghani, R.** "Topology Optimization of Wave Barriers for Mitigation of Vertical Component of Seismic Ground Motions", Journal of Earthquake Engineering, 2017.
8. **Rafiee-Dehkharghani, R.**, Ghyasvand, S., Sahebalzamani, P. "Dynamic Behavior of Masonry Arch Bridge under High-Speed Train Loading: Veresk Bridge Case Study", ASCE Journal of Performance of Constructed Facilities, 2018. [https://doi.org/10.1061/\(ASCE\)CF.1943-5509.0001158](https://doi.org/10.1061/(ASCE)CF.1943-5509.0001158)
9. Rezaie, A., **Rafiee-Dehkharghani, R.**, Dolatshahi, K.M., Mirghaderi, R. "Soil-buried wave barriers for vibration control of structures subjected to vertically incident shear waves", Soil Dynamics and Earthquake Engineering, 2018. <https://doi.org/10.1016/j.soildyn.2018.03.020>
10. Yarmohammadi, F., **Rafiee-Dehkharghani, R.**, Behnia, C., Aref, A.J. "Topology optimization of jet-grouted overlapping columns for mitigation of train-induced

- ground vibrations”, *Construction and Building Materials*, 2018.
<https://doi.org/10.1016/j.conbuildmat.2018.09.156>
11. Shahraki, M., **Rafiee-Dehkharghani, R.**, Behnia, C. “Three-Dimensional Finite Element Modeling of Stone Column-Improved Soft Saturated Ground”, *Civil Engineering Infrastructures Journal*, 2018. https://cej.ut.ac.ir/article_68740.html
 12. Yarmohammadi, F., **Rafiee-Dehkharghani, R.**, Behnia, C., Aref, A.J. “Design of wave barriers for mitigation of train-induced vibrations using a coupled genetic-algorithm/finite-element methodology”, *Soil Dynamics and Earthquake Engineering*, 2019.
<https://www.sciencedirect.com/science/article/pii/S0267726117306036>
 13. Samadzad, M., **Rafiee-Dehkharghani, R.** “A systematic wave-based method for analysis of large planar frame structures based on Timoshenko waveguide theory”, *International Journal of Dynamics and Control*, 1-18, 2019
<https://link.springer.com/article/10.1007/s40435-019-00566-1>
 14. Samadzad, M., **Rafiee-Dehkharghani, R.** “A Joint-Based Systematic Wave-Propagation Approach for Forced Vibration Analysis of Large Waveguide Systems”, *International Journal of Structural Stability and Dynamics*, 2019
<https://www.worldscientific.com/doi/abs/10.1142/S0219455419500755>
 15. Yarmohammadi, F., **Rafiee-Dehkharghani, R.** “An optimal design procedure of wave barriers for mitigation of underground and above-ground railway vibrations”, *International Journal of Structural Stability and Dynamics*, 2020,
<https://www.worldscientific.com/doi/abs/10.1142/S0219455420501217>
 16. **Rafiee-Dehkharghani, R.**, Samadzad, M., Bitaraf, M., Fallahi, R. “Seismic wave propagation in framed structures by joint-based wave refraction method”, *International Journal of Structural Stability and Dynamics*, 2021,
<https://www.worldscientific.com/doi/abs/10.1142/S021945542150054>
 17. Esmaeili Moghadam, A., **Rafiee-Dehkharghani, R.** “Optimal design of wave barriers in dry and saturated poroelastic grounds using Covariance Matrix Adaptation Evolution Strategy”, *Computers and Geotechnics*, 2021,
<https://www.sciencedirect.com/science/article/abs/pii/S0266352X21000185>

Conference Papers:

1. Zamani, R., **Rafiee-Dehkharghani, R.**, Dolatshahi, K. M. “Detection of reduced cross-section area in the semi-finite two-part rods using the fast Fourier transform”, 9th National Congress on Civil Engineering, Mashhad University, Iran, 2016.
2. **Rafiee-Dehkharghani, R.**, Ghalandarzadeh, A., Moradi, M. “Anisotropic behavior of silty sands by means of undrained monotonic triaxial tests”, *Int. Conf. on Performance-Based Design in Earthquake Geotechnical Engineering*, IS-Tokyo 2009.

3. **Rafiee-Dehkharghani, R.**, Ghalandarzadeh, A., Moradi, M. “Effect of anisotropic consolidation on undrained behavior of sand and silt mixtures”, 8th International Congress on Civil Engineering, Shiraz University, Iran, 2009.
4. Zakerinia, M. **Rafiee-Dehkharghani, R.**, Behnia, C. “A numerical study on the settlement of granular bed-stone column improved grounds”, 11th International Congress on Civil Engineering, University of Tehran, Iran, 2018.
5. Shahraki, M. **Rafiee-Dehkharghani, R.**, Behnia, C. “A numerical study on the behavior of composite and non-composite stone columns”, 11th International Congress on Civil Engineering, University of Tehran, Iran, 2018.
6. Eskandari-Ghadi, M. **Rafiee-Dehkharghani, R.** “Two-dimensional topology optimization of shallow foundation”, 11th International Congress on Civil Engineering, University of Tehran, Iran, 2018.
7. Rezaie, A., **Rafiee-Dehkharghani, R.**, Dolatshahi, K.M., Mirghaderi, R. “Optimally Located Wave Barriers for Reducing Horizontal Vibrations Induced by Earthquake”, 16th European Conference on Earthquake Engineering, Thessaloniki, Greece, 2018.

Conference Presentations:

1. **Rafiee-Dehkharghani, R.**, Aref, A. J., Dargush, G. F. “Effect of material setup and geometry on the wave propagation characteristics of layered structures”, Engineering Mechanics Institute (EMI) Conference, August 4-7, 2013, Evanston, IL.
2. **Rafiee-Dehkharghani, R.**, Aref, A. J., Dargush, G. F. “Numerical investigation of periodic structures under short period transient loading”, Engineering Mechanics Institute (EMI) Conference, June 17-20, 2012, University of Notre Dame., Notre Dame, IN.
3. **Rafiee-Dehkharghani, R.**, Aref, A. J., Dargush, G. F. “Attenuation of blast loading using functionally graded protective systems”, Engineering Mechanics Institute (EMI) Conference, June 2-4, 2011, Northeastern Univ., Boston, MA.
4. **Rafiee-Dehkharghani, R.**, Aref, A. J., Dargush, G. F. “Development of functionally graded protective systems for attenuation of blast loading”, NSF CMMI Research and Innovation Conference, January 4-7, 2011, Atlanta, GA.

PROFESSIONAL SERVICE:

University and Community Services:

- Head of Geotechnical Engineering Division, School of Civil Engineering, College of Engineering, University of Tehran, Tehran, IRAN
- Book Committee Member Representative of School of Civil Engineering, College of Engineering, University of Tehran, Tehran, IRAN

Technical Referee:

- Journal of Engineering Mechanics, ASCE
- Journal of Structural Engineering, ASCE
- Journal of Bridge Engineering, ASCE
- International Journal of Structural Stability and Dynamics, World Scientific
- Civil Engineering Infrastructures Journal (CEIJ)
- Journal of Structure and Steel, Iranian Society of Steel Structures
- Modares Civil Engineering Journal (MCEJ)
- Engineering Structures (Elsevier)
- Korean Society of Civil Engineers journal (KSCE)

Professional Societies and Technical Committee Membership

- Member of Iranian Geotechnical Society
- Member of Alumni Association of the Faculty of Eng. of university of Tehran
- Committee Member of National Blast Engineering Code of Iran (Mabhas 21)

Conferences and seminars:

- Executive Committee Member of 5th Int. Conf. on Geotechnical Eng. & Soil Mech. (14-16 November 2016, Tehran, IRAN)
- Scientific Committee member of 11th International Congress on Civil Engineering (8-10 May 2018, Tehran, IRAN)