

Resume

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and

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Personal Information

Date of Birth: September 23, 1958

Marital Status: Married, two children

Research Interests

Finite element and discrete element modeling of geomaterials

Fracture mechanics

Plasticity analysis and its application in rock and soil mechanics

Development of computer codes for numerical modeling of geomaterials

In situ testing of geomaterials

Education

1984 B.Sc. Civil Engineering, Iran University of Science & Technology, Iran

1987 M.Sc. Civil Engineering, University of Shiraz, Iran

1992 Ph.D. Civil Engineering (Geomechanics), University of Minnesota, USA

Honors and Awards

84 Top student, University of Science and Technology, Tehran, Iran

87 Top graduate student, Shiraz University, Shiraz, Iran

88-92 Scholarship during my PhD study, Ministry of Culture & Higher Education of Iran

88-92 Research assistantship, Department of Civil and Mineral Engineering, University of Minnesota, USA

99 Outstanding Research Award, University of Tarbiat Modares, Tehran, Iran

99 Award for contributing to the Iranian Earthquake Code 2800, Ministry of Housing and Urban Development

00 Outstanding Research Award, University of Tarbiat Modares, Tehran, Iran

01 Outstanding Teaching Award, University of Tarbiat Modares, Tehran, Iran

12 Best Student Paper Award, American Rock Mechanics Association (ARMA)

13 Distinguished Research Award, New Mexico Tech, USA

13 MS Thesis Award (Awarded to my graduate student, Ali Tarokh), American Rock Mechanics Association (ARMA)

15 Best published book award, Tarbiat Modares University

- 16- Member of Editorial Board, Rock Mechanics and Rock Engineering
- 16- Member of Editorial Board, Modares Civil Engineering Journal
- 17 J.S. Braun/Braun Intertext Visiting Professor, Department of Civil, Environmental and Geo-Engineering, University of Minnesota, Fall 2017.
- 21 J.S. Braun/Braun Intertext Visiting Professor, Department of Civil, Environmental and Geo-Engineering, University of Minnesota, Spring 2021.

Academic Experience

- 88-92 Research Assistant, University of Minnesota, USA
- 92-93 Post Doctoral Fellow, University of Minnesota, USA
- 93-00 Assistant Professor, Department of Civil Engineering, Tarbiat Modares University, Tehran, Iran
- 94-96 Head of Soil Mechanics Group, Tarbiat Modares University, Iran
- 94-01 Researcher, Building & Housing Research Center, Tehran, Iran
- 96-98 Head, Department of Civil Engineering, Tarbiat Modares University, Iran
- 98-00 Head, Soil Mechanics Group, Tarbiat Modarres University
- 00- Associate Professor, Department of Civil Engineering, Tarbiat Modares University
- 01-02 Research Scholar, Department of Civil Engineering, University of Minnesota
- 02-09 Associate Professor, Department of Mineral Engineering, New Mexico Tech
- 09-18 Professor, Department of Mineral Engineering, New Mexico Tech
- 13- Adjunct Professor, Department of Mechanical Engineering, New Mexico Tech
- 22 Visiting Professor, Department of Mineral Engineering, New Mexico Tech, Socorro, NM

Membership of Scientific Societies

1. Member of International Society for Rock Mechanics (ISRM)
2. Member of American Rock Mechanics Association (ARMA)

Refereed Journal Publications

1. Fakhimi, A. A., and Fairhurst, C. (1994), A model for the time-dependent behavior of rock, *Int. J. Rock Mech. Min. Sci. & Geomech. Abstr.*, 31(2): 117-126.
2. Fakhimi, A. A., and Fairhurst, C. (1996), Time-dependent stability of excavations in jointed rock, *Iranian Journal of Science and Technology*, 20(3): 251-272. Transaction B.
3. Tavakoli, H. R. and Fakhimi, A. A. (1997), Computerized rock slope stability analysis using block theory, (in Farsi), *Amirkabir Journal*, 34, 89-98, Tehran, Iran.
4. Fakhimi, A. A., Haji Azizi, M., and Moharrami, H. (2000), A new method for determination of critical slip surfaces in earth slopes, (in Farsi), *Esteghlal Journal of Engineering*, 18(2): 97-115, Esfahan, Iran.
5. Fakhimi, A. A., and Salehi, D. (2000), Numerical limit equilibrium methods in slope stability analysis, *Iranian Journal of Science and Technology*, 24(1): 49-61, Transaction B., Shiraz, Iran.
6. Fakhimi, A. A., and Kianfar, K. (2000), Numerical modeling of pile driving, *Iranian Journal of Science and Technology*, 24(1): 35-47, Transaction B, Shiraz, Iran.

7. Fakhimi, A. A., and Moosavi, M. J. (2000), Earthquake induced permanent displacement of slopes: a numerical study, *International Journal of Engineering*, 13(4): 73-79, Tehran, Iran.
8. Fakhimi, A. A. (2000), A computer program for modeling large deformation nonlinear and transient problems in geotechnical engineering, (in Farsi), *Esteghlal Journal of Engineering*, 19(1): Isfahan, Iran.
9. Fakhimi, A. A. and Heidari, G. (2001), Numerical modeling of cone penetration test in soils, (in Farsi), *International Journal of Science and Technology*, Special Issue,57-74, Tehran, Iran.
10. Fakhimi, A. A., Moharrami, H., and Vakili, K. (2001), Application of genetic algorithm in determination of critical slip surfaces of slopes, (in Farsi), *International Journal of Science and Technology*, 12(2): 181-197, Tehran, Iran
11. Fakhimi, A., Carvalho, F., Ishida, T. and Labuz, J. F. (2002), Simulation of failure around a circular opening in rock, *International Journal of Rock Mechanics & Mining Sciences*, 39, 507-515.
12. Fakhimi, A., Salehi, D., and Mojtabai, N. (2004), Numerical back analysis for estimation of soil parameters in the Resalat Tunnel project, *Tunnelling and Underground Space Technology*, 19, 57-67.
13. Fakhimi, A. (2004), Application of slightly overlapped circular particles assembly in numerical simulation of rocks with high friction angles, *Engineering Geology*, 74, 129-138.
14. Fakhimi, A., Riedel, J. J., and Labuz J. F. (2006), Shear banding in sandstone: physical and numerical studies, *International Journal of Geomechanics*, Vol 6, No. 3, 185-194.
15. Fakhimi, A. and Villegas, T. (2007), Application of dimensional analysis in calibration of a discrete element model for rock deformation and fracture, *Rock Mech. Rock Engng.* 40 (2), 193-211.
16. Fakhimi, A., Boakye, K., Sperling, D., and McLemore, V. (2008), Development of a modified in situ direct shear test technique to determine shear strength of mine rock piles, *Geotechnical Testing Journal*, Vol. 31, No. 3, 1-5.
17. Fakhimi, A. (2009), A hybrid discrete-finite element model for numerical simulation of geomaterials, *Computers and Geotechnics*, 36, 386-396.
18. Lin, Q., Fakhimi, A., Haggerty, M., and Labuz, J.F. (2009), Initiation of tensile and mixed-mode fracture in sandstone, *International Journal of Rock Mechanics and Mining Sciences*, 46, 489-497.
19. Bobet, A., Fakhimi, A., Johnson, S., Morris, J., Tonon, F. and Yeung, M.R. (2009), Numerical models in discontinuous media: review of advances for rock mechanics applications, *Journal of Geotechnical and Geoenvironmental Engineering*, Vol. 135, No. 11, 1547-1561.
20. Fakhimi, A., and Gharahbagh, E. (2011), Discrete element analysis of the effect of pore size and pore distribution on the mechanical behavior of rock, *International Journal of Rock Mechanics and Mining Sciences*, 48, 77-85.
21. Fakhimi, A. and Hosseinpour, H. (2011), Experimental and numerical study of the effect of an oversize particle on the shear strength of mined-rock pile material, *Geotechnical Testing Journal*, Vol. 34, No.2, 131-138.
22. Fakhimi, A. and Tarokh, A. (2013), Process zone and size effect in fracture testing of rock, *International Journal of Rock Mechanics and Mining Sciences*, 60, 95-102.
23. Fakhimi, A. and Lanari, M. (2014), DEM-SPH simulation of rock blasting, *Computers and Geotechnics*, 55, 158-164.
24. Tarokh, A. and Fakhimi, A. (2014), Discrete element simulation of the effect of particle size on the size of fracture process zone in quasi-brittle materials, *Computers and Geotechnics*, 62, 51-60.
25. Galouei, M. and Fakhimi, A. (2015), Size effect, material ductility and shape of fracture process zone in quasi-brittle materials, *Computers and Geotechnics*, 65, 126-135.
26. Lanari, M. and Fakhimi, A. (2015), Numerical study of contributions of shock wave and gas

- penetration toward induced rock damage during blasting, *Computational Particle Mechanics*, Vol 2, Issue 2, 197-208.
27. Fakhimi A. and Hemami B. (2015), Axial splitting of rocks under uniaxial compression, *International Journal of Rock Mechanics and Mining Sciences*, 79, 124-134.
 28. Tarokh A., Kao C., Fakhimi A., and Labuz J. (2016), Spalling and brittleness in surface instability failure of rock, *Geotechnique* 66, No. 2, 161-166.
 29. Fakhimi, A., Hosseini, O., and Theodore, R. (2016), Physical and numerical study of strain burst of mine pillars, *Computers and Geotechnics*, 74, 36-44.
 30. Tarokh, A., Blanksma, D.J., Fakhimi, A., and Labuz, J.F. (2016), Fracture initiation in cavity expansion of rock, *International Journal of Rock Mechanics and Mining Sciences*, 85, 84-91.
 31. Tarokh A., Kao C., Fakhimi A., and Labuz J. (2016), Insights on surface spalling of rock, *Computational Particle Mechanics*, DOI 10.1007/s40571-016-0108-5.
 32. Fakhimi, A. and Wan, F. (2016), Discrete element modeling of the process zone shape in mode I fracture at peak load and in post-peak regime, *International Journal of Rock Mechanics and Mining Sciences*, 85, 119-128.
 33. Tarokh, A., Makhnenko, Y.R., Fakhimi, A., and Labuz, J. (2017), Scaling of the fracture process zone in rock, *International Journal of Fracture*, Vol. 204, Issue 2, 191-204.
 34. Hajiazizi, M., Bavali, M., and Fakhimi, A. (2017), Numerical and Experimental Study of the Optimal Location of Concrete Piles in a Saturated Sandy Slope, *International Journal of Civil Engineering*, DOI 10.1007/s40999-017-0155-1.
 35. Fakhimi, A. and Hemami, B. (2017), Rock uniaxial compression test and axial splitting, *Procedia Engineering*, 191, 623-630.
 36. Fakhimi, A., Tarokh, A. and Labuz F. (2017), Cohesionless crack at peak load in a quasi-brittle material, *Engineering Fracture Mechanics*, 179, 272-277.
 37. Fakhimi, A., Azhdari, P. and Kimberley, J. (2018), Physical and numerical evaluation of rock strength in Split Hopkinson Pressure Bar testing, *Computers and Geotechnics*, 102, 1-11.
 38. Fakhimi, A., Lin, Q. and Labuz, J. (2018), Insights on rock fracture from digital imaging and numerical modeling, *International Journal of Rock Mechanics and Mining Sciences*, 107, 201-207.
 39. Fakhimi, A. and Norouzi, S. (2018), Dilation angle in bonded particle simulation of rock, *Journal of Computational Particle Mechanics*, DOI 10.1007/s40571-018-0208-5.
 40. Afrazi, M., Yazdani, M., Alitalesh, M. and Fakhimi, A. (2018), Numerical evaluation of involved parameters in direct shear testing of soil using a hybrid bonded particle-finite element system (in Farsi), *Modares Civil Engineering Journal*, Vol 18, No. 3.
 41. Lin, Q., Wan, B., Wang, S., Li, S., and Fakhimi, A. (2019), Visual detection of a cohesionless crack in rock under three-point bending, *Engineering Fracture Mechanics*, 211, 17-31.
 42. Mazhary, M., Yazdani, M. and Fakhimi, A. (2019), Simulation of multi-phase medium using BPM-SPH hybrid method (in Farsi), *Modares Civil Engineering Journal*, Vol 19, No. 4, 187-200.
 43. Alitalesh, M., Yazdani, M. Fakhimi, A. and Naeimabadi, M. (2020), Effect of loading direction on interaction of two pre-existing open and closed flaws in a rock-like brittle material, *Underground Space*, Vol. 5, Issue 3, 242-257.
 44. Majedi, M.R., Afrazi, M. and Fakhimi A. (2020), A micromechanical model for simulation of rock failure under high strain rate loading, *International Journal of Civil Engineering*, <https://doi.org/10.1007/s40999-020-00551-2>.
 45. Rouhanifar, S., Afrazi, M., Fakhimi, A. and Yazdani, M. (2020), Strength and deformation behavior of sand-rubber mixture, *International Journal of Geotechnical Engineering*, <https://doi.org/10.1080/19386362.2020.1812193>.
 46. Asadi, P. and Fakhimi A. (2020), Numerical modeling of the coupled effect of specimen size and loading rate on the dynamic tensile strength of rock (in Farsi), *Modares Civil Engineering Journal*, 21(1), 135-147.

47. Shirzehhagh M. and Fakhimi A. (2021), Insights on crack initiation and propagation in reinforced concrete beams, a bonded-particle approach, *Engineering Structures*, 244-112783.
48. Rajab Doost, M., Taheri, E., and Fakhimi, A. (2021), Combined SPH-DEM modeling of solid-fluid interactions, *Journal of Hydraulic Structures*, 7(2):72-99.
49. Asadi, P., Ashrafi, M.J. and Fakhimi, A. (2021), Physical and numerical evaluation of effect of specimen size on dynamic tensile strength of rock, *Computers and Geotechnics*, <https://doi.org/10.1016/j.compgeo.2021.104538>
50. Sakipour, S. Yazdani, M., and Fakhimi, A. (2022), Experimental study of crack propagation at the interface of two different materials using digital image correlation technics, *Sharif Civil Engineering Journal*, 37-2(4.1), 3-12.
51. Afrazi, M., Lin, Q. and Fakhimi, A. (2022), Physical and Numerical Evaluation of Mode II Fracture of Quasi-Brittle Materials, *International Journal of Civil Engineering*, 20:993-1007, <https://doi.org/10.1007/s40999-022-00718-z>
52. Asadi, P. and Fakhimi, A. (2022), Coupled effect of loading rate and notch length on tensile strength of rock, *Sharif Civil Engineering Journal*, DOI: 10.24200/J30.2022.59263.3038
53. Fakhimi, A. and Labuz J. (2022), A simple apparatus for tensile testing of rock, *International Journal of Rock Mechanics and Mining Sciences*, Vol. 158, 105208, <https://doi.org/10.1016/j.ijrmms.2022.105208>
54. Fareghian, M., Afrazi, M. and Fakhimi A. (2023), Soil reinforcement by waste tire textile fibers: small scale experimental tests, *Journal of Materials in Civil Engineering*, ASCE, 35(2): 04022402, DOI: [10.1061/\(ASCE\)MT.1943-5533.0004574](https://doi.org/10.1061/(ASCE)MT.1943-5533.0004574).
55. Asadi, P. and Fakhimi, A. (2023), Bonded particle modeling of grain size effect on tensile and compressive strengths of rock under static and dynamic loading, *Advanced Powder Technology*, 34, 104013, <https://doi.org/10.1016/j.appt.2023.104013>
56. Asadi, P., Fakhimi, A. and Ashrafi, M.J. (2023), Dynamic tensile strength of rock specimens with different defect lengths, *Engineering Fracture Mechanics*, 284-109245, <https://doi.org/10.1016/j.engfracmech.2023.109245>

Non-refereed publications

1. Fakhimi, A. A. and Nazarpour, H. (1998), The role of soil strength parameters and step by step excavation on tunnel design and the case study of a tunnel under construction in Iran, (in Farsi), *Geotechnique & Strength of Material Journal*, 16, Tehran, Iran.
2. Fakhimi, A. A. and Zakeri, M. (1999), Stability analysis of arch dam foundations and Khersan III Dam case study, (in Farsi), *Geotechnique & Strength of Material Journal*, 17, Tehran, Iran.

Papers Presented in Conferences

1. Fakhimi, A. A. and Ghahramani, A. (1987), Associated field method and its application in retaining wall analysis, (in Farsi), *Proceedings of First Congress on Road Maintenance*, Tehran, Iran.
2. Behpoor, L., Ghahramani, A. and Fakhimi, A. A. (1993), Computerized static and dynamic passive earth pressures by the method of associated fields, Part I, *Proceedings of International Congress on Computational Methods in Engineering*, Shiraz University, Iran.

3. Fakhimi, A. A., Behpoor, L., and Ghahramani, A. (1993), Computerized static and dynamic passive earth pressures by the method of associated fields, Part II, Proceedings of International Congress on Computational Methods in Engineering, Shiraz, Iran.
4. Fakhimi, A. A. (1997), Numerical modeling of jointed media, Proceedings of 4th International Conference on Civil Engineering, Vol. II, 130-136, Sharif University of Technology, Tehran, Iran.
5. Fakhimi, A. A. (1997), Static and dynamic stability analysis of earth dams, (in Farsi), Proceedings of the First Iranian Seminar on Earth Dams, 78-86, Tehran, Iran.
6. Fakhimi, A. A. and Naseri, M. H. (1998), Non-linear analysis of soil-support interaction in underground excavations, Proceedings of 4th Tunnel Conference, 262-271, Amirkabir University of Technology, Tehran, Iran.
7. Fakhimi, A. A. and Nobakht Vakili, K. (2000), Genetic algorithm and its application in determination of critical slip surfaces of slopes, Proceedings of 5th International Conference on Civil Eng., Ferdowsi University of Mashad, Iran.
8. Fakhimi, A. and Labuz, J. F. (2002), Modeling rock failure around a circular opening, Proceedings of the Third International Conference on Discrete Element Methods, Santa Fe, NW, USA, ASCE Geotechnical Special Publication, No. 117, PP. 323-328.
9. Fakhimi, A. and Villegas, T. (2004), Calibration of a discrete element model for rock failure envelope and tensile strength, Numerical modeling in micromechanics via particle methods, Proceedings of the 2nd International PFC Symposium, Shimizu, Hart and Cundall (Editors), Japan, pp. 383-390.
10. Fakhimi, A., Lin, Q., Haggerty, M., and Labuz, J. F. (2005), Development of fracture in bending experiments, ARMA/USRMS 05-844, The 40th US Rock Mechanics Symposium, Anchorage, Alaska.
11. Fakhimi, A. and Akbarzadeh, Y. (2006), Numerical simulation of size effect in rock, ARMA/USRMS 06-965, The 41st US Rock Mechanics Symposium & 50th Anniversary, Golden, Colorado.
12. Viterbo, V., McLemore, V., Donahue, K., Aimone-Martin, C., Fakhimi, A., and Sweeney, D. (2007), Effects of chemistry, mineralogy, petrography and alteration on rock engineering properties of the Goat Hill rock pile at the Molycorp Questa mine, New Mexico, SME Annual Meeting, Preprint 07-099, Feb. 25-28, Denver, Colorado.
13. Fakhimi, A. and Hosseinpour, H. (2008), The role of oversized particles on the shear strength and deformational behavior of rock pile material, ARMA08-204, 42nd US Rock Mechanics Symposium and 2nd US-Canada Rock Mechanics Symposium, June 27 – July 3, San Francisco, USA.
14. Hosseinpour, H. and Fakhimi, A. (2008), Shear behavior of rock pile material with oversize particles, ISRM International Symposium and 5th Asian Rock Mechanics Symposium (ARMS5), November 24-26, 2008, Tehran, Iran.
15. Nunoo, S., McLemore, V.T., Fakhimi, A., and Ayakwah, G., (2009), The effect of weathering on particle shape of Questa mine material, Preprint 09-018, Society of Mining, Metallurgy and Exploration Annual Meeting (SME), Denver, Colorado, USA, Feb 2009.
16. Ayakwah, F.G., McLemore, V.T., Fakhimi, A., and Viterbo, V.C., Dickens, A.K., (2009), Effects of weathering and alteration on point load and slake durability indices of Questa mine materials, New Mexico, Preprint 09-019, Society of Mining, Metallurgy and Exploration Annual Meeting (SME), Denver, Colorado, USA, Feb 2009.
17. Fakhimi, A. and Gharahbagh, E.A. (2009), Discrete element modeling of the influence of void size and distribution on the mechanical behavior of rock, ROCKENG09: Proceedings of the 3rd CANUS Rock Mechanics Symposium, Toronto, Canada, May 9-14 (Ed: M. Diederichs and G. Grasselli).
18. Gharahbagh, E.A. and Fakhimi, A. (2010), Numerical determination of representative volume element of rock, ARMA 10-131, 44th US Rock Mechanics Symposium and 5th US-Canada Rock Mechanics Symposium, Salt Lake City, UT, June 27-30.

19. Gharahbagh, E.A. and Fakhimi, A. (2010), Pore distribution and statistical size effect: a discrete element analysis, ARMA 10-322, 44th US Rock Mechanics Symposium and 5th US-Canada Rock Mechanics Symposium, Salt Lake City, UT, June 27-30.
20. Boakye, K., Fakhimi, A., and McLemore, V.T. (2010), Relationship between physical, chemical, and mineralogical properties and cohesion of Questa rock pile materials, ARMA 10-165, 44th US Rock Mechanics Symposium and 5th US-Canada Rock Mechanics Symposium, Salt Lake City, UT, June 27-30.
21. Fakhimi, A., Boakye, K., McLemore, V.T., and Sweeney, D. (2011), The effect of weathering and age on shear strength of Questa Mine rock piles, New Mexico, USA, ARMA 11-153, 45th US Rock Mechanics Symposium, San Francisco, CA, June 26-29.
22. Gharahbagh, A.E. and Fakhimi, A. (2011), The effect of pore size on tensile and compressive strength of rock: A bonded particle simulation, ARMA 11-122, 45th US Rock Mechanics Symposium, San Francisco, CA, June 26-29.
23. Tarokh, A. and Fakhimi, A. (2012), Size effect, fracture toughness, and process zone in numerical simulation of rock fracture, Proceedings of 9th International Congress on Civil Engineering, Isfahan University of Technology, Isfahan, Iran, May 8-10.
24. Tarokh, A., Fakhimi, A., and Labuz, J.F. (2012), Size of process zone in fracture testing of rock, ARMA 12-258, 46th US Rock Mechanics/Geomechanics Symposium, Chicago, IL, June 24-27.
25. Fakhimi, A., Nunoo, S., Van Zyl, D., and McLemore, V.T. (2012), The effect of material scalping and water content on the shear strength of Questa mine materials, ARMA 12-256, 46th US Rock Mechanics/Geomechanics Symposium, Chicago, IL, June 24-27.
26. Anim, A. and Fakhimi, A. (2012), Effect of deformation rate on shear strength of Questa rock pile materials, ARMA 12-140, 46th US Rock Mechanics/Geomechanics Symposium, Chicago, IL, June 24-27.
27. Rahnema, A., Mojtabai, N., Razavi, M., and Fakhimi, A. (2012), Numerical analysis of room closure rate in an underground potash mine, ARMA 12-524, 46th US Rock Mechanics/Geomechanics Symposium, Chicago, IL, June 24-27.
28. Fakhimi, A. (2013), A numerical model for rock explosion, Presented and published in the Proceedings of 3rd International Conference on Computational Contact Mechanics, Università del Salento, July 10-12, 2013-Lecce, Italy.
29. Tarokh, A. and Fakhimi, A. (2013), Relationship between grain size and fracture properties of rock, ARMA 13-168, 47th US Rock Mech / Geomechanics Symposium, San Francisco, CA, June 23-26.
30. Hemami, B. and Fakhimi, A. (2014), Numerical simulation of rock-loading machine interaction, ARMA 14-7488, 48th US Rock Mechanics / Geomechanics Symposium, Minneapolis, MN, June 1-4.
31. Tarokh, A., Labuz, J.F., Kao, C.S., and Fakhimi, A. (2014), Surface spalling and the effects of boundary conditions, ARMA 14-7501, 48th US Rock Mechanics / Geomechanics Symposium, Minneapolis, MN, June 1-4.
32. Lanari, M.A. and Fakhimi, A. (2014), Numerical simulation of rock blasting, ARMA 14-7147, 48th US Rock Mechanics / Geomechanics Symposium, Minneapolis, MN, June 1-4.
33. Fakhimi, A. and Galouei, M. (2015), Influence of porosity and material ductility on fracture process zone: A numerical study, Proceedings of 10th International Congress on Civil Engineering, 5-7 May 2015, University of Tabriz, Tabriz, Iran.
34. Hosseini, O., Theodore, R., Razavi, M., and Fakhimi, A. (2015), Rock burst of underground pillars, ARMA 15-0650, 49th US Rock Mechanics / Geomechanics Symposium, San Francisco, CA, 28 June – 1 July.
35. Fakhimi, A. and Galouei, M. (2015), Size effect on length and width of fracture process zone, ARMA 15-0284, 49th US Rock Mechanics / Geomechanics Symposium, San Francisco, CA, 28 June – 1 July.

36. Tarokh, A., Blanksma, D.J., Fakhimi, A. and Labuz, J.F. (2015), Critical pressure and scaling in cavity expansion tests, ARMA 15-746, 49th US Rock Mechanics / Geomechanics Symposium, San Francisco, CA, 28 June – 1 July.
37. Wan, F. and Fakhimi, A. (2016), Numerical three-point bending test of fracture process zone in post-peak deformation of rock, ARMA 16-233, 50th US Rock Mechanics / Geomechanics Symposium, Houston, Texas, 26-29 June.
38. Tarokh, A., Peng, J., Fakhimi, A. and Labuz, J.F. (2016), Evaluation of brittleness from spalling and bending tests, ARMA 16-800, 50th US Rock Mechanics / Geomechanics Symposium, Houston, Texas, 26-29 June.
39. Molaei, F., Tarokh, A., Labuz, J.F. and Fakhimi, A. (2016), Rock fracture in cavity expansion test, International Conference on Geomechanics, Geo-energy and Geo-resources, IC3G 2016, 28-29 September, Monash University, Melbourne, Australia.
40. Norouzi, S. and Fakhimi, A. (2017), A micro-mechanical model for studying the effect of ductility and micro-crack intensity on rock strength characteristics, ARMA 17-596, 51st US Rock Mechanics/Geomechanics Symposium, San Francisco, California, 25-28 June.
41. Azhdari P., Kimberely J. and Fakhimi A. (2018), Bonded particle-finite element simulation of rock in Split Hopkinson Pressure Bar test, ARMA 18-0218, 52nd US Rock Mechanics/ Geomechanics Symposium, Seattle, Washington, 17-20 June.
42. Molaei, F. and Fakhimi, A. (2019), Bonded particle simulation of cavity expansion test in rock, ARMA 19–28, 53rd US Rock Mechanics/Geomechanics Symposium, New York, NY, 23–26 June.
43. Majedi, M.A., Afrazi, M. and Fakhimi, A. (2020), FEM-BPM simulation of SHPB testing for measurement of rock tensile strength, ARMA 20–1434, 54rd US Rock Mechanics/Geomechanics Symposium, Golden, Colorado, USA, 28 June-1 July 2020.
44. Asadi, P. and Fakhimi, A. (2021), Numerical modeling of effect of specimen size on dynamic tensile strength of rock, ARMA 21–1265, 55th US Rock Mechanics/Geomechanics Symposium, Houston, Texas, USA, 20-23 June 2021.
45. Fakhimi, A., Asem, P., Tarokh, A. and Labuz, J. (2022), Critical crack opening of Charcoal granite, ARMA 22-0447, 55th US Rock Mechanics/Geomechanics Symposium, Santa Fe, New Mexico, USA, 26-29 June 2022.
46. Asadi, P. and Fakhimi, A. (2023), Numerical evaluation of the role of grain size and loading rate on the rock tensile strength, 13th International Congress on Civil Engineering, Iran University of Science and Technology, Tehran, Iran, October 17-19.
47. Sadeghian, M.H. and Fakhimi, A. (2023), Evaluation of particle breakage, creep, and saturation collapse of conglomerate rock material of Masjid Sloeyman Dam, 13th International Congress on Civil Engineering, Iran University of Science and Technology, Tehran, Iran, October 17-19.

Selected Research Projects and Reports

1. Labuz, J. F., Fakhimi, A. A. & Fairhurst, C. (1993), Thermal radiation as an excavation tool: a numerical study, Technical Report, Submitted to HDRK Mining Research Limited, Canada, Manitoba, R8N 1P3.
2. Fakhimi, A. A. (1996), Development of CA2 computer program for modeling large deformation problems, Building and Housing Research Center, Tehran, Iran.
3. Fakhimi, A. A. (1996-1997), CA2 computer program, version 2.00, Building and Housing Research Center, Tehran, Iran.
4. Fakhimi, A. A. and Haji Azizi, M. (1998), Determination of critical slip surfaces of slopes using CA2 computer program, Building and Housing Research Center, Tehran, Iran.

5. Fakhimi, A. A. (1999-2000), Modification of CA2 computer program for modeling viscoelastic behavior of geomaterials, Building and Housing Research Center, Tehran, Iran.
6. Birgisson, B., Fakhimi, A., and Wang, J. (2006), Practical modeling of rock behavior under dynamic loading: softening and damage in continuum models, DTRA0003, subcontract S03-36, USA, budget: \$335,000.
7. Fakhimi, A. (2007-2008), Three dimensional numerical modeling of geomaterials using a discrete element computer program: debugging, verification, and calibration. NIOSH Spokane Research Laboratory, USA, Order No. 214-2007-M-21949, budget: \$24,500.
8. Fakhimi, A. and other colleagues (2006-2009), More than ten technical reports related to Questa rock pile weathering and stability project, Chevron Mining, New Mexico, USA, Total budget: \$12,000,000, Dr. Fakhimi's budget: \$450,000.
9. Razavi, M., Mojtabai, N. and Fakhimi, A. (2010- 2011), Development of a new technique to monitor the deformation in underground tunnels using image processing and creep modeling. Mosaic Potash, New Mexico. Budget: \$85,000.
10. Romero V. (PI), Fakhimi A., Mojtabai, N., Altig, J., Hensley, M., Ford, J., Chavez, G. and Lions, M. (2015), Review of the investigation on the breach of a nuclear waste container in WIPP, DOE, budget: \$795,086

Published Books

1. Fakhimi, A. (1998), Theory and users' manual of CA2 computer program, (in Farsi), No. 262, Building and Housing Research Center, Tehran, Iran.
2. Fakhimi, A. and Yazdani, M. (2014), Deformation and fracture of materials with emphasis on rock mechanics, (in Farsi), Tarbiat Modares University Press, Tehran, Iran.
3. Fakhimi, A. and Afrazi, M. (2023), Elastic theory of materials, (in Farsi), Tarbiat Modares University Press, Tehran, Iran.

Courses Taught

1. Rock Mechanics (graduate)
2. Advanced Finite Element Analysis (graduate)
3. Continuum Mechanics (graduate)
4. Theory of Elasticity (graduate)
5. Soil Mechanics (undergraduate)
6. Solid Mechanics Lab (undergraduate)
7. Applied Geomechanics (undergraduate)
8. Rock Mechanics and Lab (undergraduate)
9. Finite Element Analysis and Design (undergraduate)
10. Limit Analysis and Plasticity (graduate)

Developed Softwares

Two computer programs have been developed as briefly described here:

1. The **CA2** (Continuum Analysis, 2 dimensional) is a finite element-discrete element computer program which can analyze the following problems:
 1. Two dimensional continuum solid body

2. Linear and non-linear models such as linear elastic, elasto-plastic and visco-elastic
3. Small and large deformation problems
4. Isotropic or anisotropic fluid flow in porous media
5. Fluid flow-mechanical deformation interaction
6. A solid body with joints or interfaces
7. Soil-structure interaction
8. Static and dynamic problems
9. Slope stability with optimization techniques
10. Interaction of a discrete system with a continuous body
11. Crack propagation in brittle materials

CA2 has powerful graphical capabilities. It is a user friendly computer program with its own compiler. Complicate constitutive models can be defined and introduced to the program by using this developed compiler. This code has been written using a combination of Fortran and C++ languages.

The original version of CA2 program is being used by the industry and universities in Iran. The code was modified during my service at New Mexico Tech to work under Windows operating system. Furthermore, new features such as discrete element modeling of geomaterials was implemented into the code. Recently, smooth particle hydrodynamics model was added to CA2. This allows the user to study the rock blasting and dynamic crack propagation by considering full interaction of gas and rock.

2. The **CA3** (Continuum Analysis, 3 dimensional) is a hybrid finite element-discrete element computer program for large deformation analysis of static and dynamic problems. This code has been written in C++ during my service at New Mexico Tech. The code can analyze a continuum three dimensional body with or without interaction with a three dimensional discrete system. A continuum body can be analyzed as a linear elastic, elastic-plastic with hardening or softening, and visco-plastic material. The discrete part is made of spheres that can interact through normal and shear springs. To simulate failure, the bonds between spheres can break. One important feature of this code is that the surrounding walls are made of deformable continuum bodies not rigid ones. Therefore, external forces can be applied directly to the walls. The graphical parts of this code have been written with OpenGL.

Consulting Experience

- 97 Numerical Analysis of a Tunnel, Rah Shahr Consulting Engineers, Tehran, Iran.
- 97-98 Pile Drivability Analysis of SPD1 Jacket in Persian Gulf, Amid Engineering and Development Company, Tehran, Iran.
- 98-99 Design and Numerical Analysis of Interaction of Arch Dams and Rock Abutments, Mahab-Ghods Consulting Engineers, Tehran, Iran.
- 00-01 Design and Numerical Analysis of Resalat Tunnel, Head of Engineering Group, Mahab-Ghods Consulting Engineers, Tehran, Iran.
- 03-05 Member of review board, Rock pile stability project, Questa Mine, New Mexico, USA.
- 06-09 Member of research team, Responsible for designing and conducting large *in situ* direct shear tests and member of geotechnical and numerical modeling committees, Rock pile weathering and stability project, Questa Mine, New Mexico, USA.

Journal Reviewer

- Rock Mechanics and Rock Engineering (member of editorial board)

- International Journal of Rock Mechanics and Mining Sciences
- Computers and Geotechnics
- Engineering Fracture Mechanics
- Journal of Geotechnical and Geoenvironmental Engineering (ASCE)
- Bulletin of Engineering Geology and Environment
- Modares Civil Engineering Journal (member of editorial board)
- International Journal of Coal Science and Technology