



# Amin RAFIEI

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## Curriculum Vitae

*"When one door closes, another opens; but we often look so long and so regretfully upon the closed door that we do not see the one which has opened for us" - Alexander Graham Bell*

### Personal Information

Date of birth September 8, 1978  
Place of birth Ahvaz, Iran

### Marital Status

- Married with one child

### Education

- 2005 – 2009 **Ph.D.**, *Ferdowsi University of Mashhad, Iran, Department of Mathematics.*
- Title of Thesis: RIF-Ns and SAINV-Ns preconditioners
  - Supervisor: Prof. Faezeh Toutounian
- 2002 – 2004 **M.Sc.**, *Ferdowsi University of Mashhad, Iran, Department of Mathematics.*
- Title of Thesis: Krylov subspace methods to solve large sparse Sylvester equation
  - Supervisor: Prof. Faezeh Toutounian
- 1998 – 2002 **B.Sc.**, *Vali Asr University of Rafsanjan, Iran, Department of Mathematics.*

### Research Interests

- Parallel, Scientific and CUDA Computing
- Numerical Linear Algebra
- Preconditioning Techniques
- Iterative Methods
- Saddle Point Systems
- Multigrid Methods
- Domain Decomposition Techniques

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- Mixed Finite Element Methods
- Multigrid Methods

## Academic Positions

- 09/2009-08/2019 **Assistant Professor**, *Hakim Sabzevari University*, Sabzevar, Iran.
- 09/2019-09/2022 **Associate Professor**, *Hakim Sabzevari University*, Sabzevar, Iran.

## Visiting Position

- 2017 **Invited Professor**, *Laboratoire Analyse, Geometrie et Applications*, Paris 13 University, France.
- o Amount of fund: 4030€

## Research Grants

- 2007-2008 **Exchange Ph.D. student**, *Institute Computational Mathematics*, Technische Universität Braunschweig, Germany.
- o Supervisor: Prof. Matthias Bollhoefer
  - o Amount of fund: 10.800€
- 2015 **Abel Visiting Scholarship**, *Institute Computational Mathematics*, Technische Universität Braunschweig, Germany.
- o Supervisor: Prof. Matthias Bollhoefer
  - o Amount of fund: 5000\$ + 1500€
- 2017-2018 **Postdoc Researcher**, *INRIA research centre of Paris*, France.
- o Supervisor: Prof. Laura Grigori
  - o Amount of fund: 10.200€

## Honors

- 2002 **First rank B.Sc. student**, *Vali Asr University of Rafsanjan*, Iran.
- 2002 **Second rank**, *Entrance Examination of M.Sc. level in Iran*.
- 2004 **First rank M.Sc. student**, *Ferdowsi University of Mashhad*, Iran.
- 2004 **10th rank**, *International Scientific Olympiad of University Students held in Iran*.
- 2005 **First rank**, *Entrance Examination of Ph.D. degree*, Ferdowsi University of Mashhad, Iran.

## Programming Skills

- o Fortran 90, Fortran 77, C, Matlab, Python
- o Parallel programming skills: OpenMP, MPI
- o familiar with CUDA

## Teaching Experiences

### Undergraduate Courses

- 2009-Present
- Numerical analysis 1 and 2
  - Calculus 1, 2 and 3
  - Linear algebra
  - Numerical Linear Algebra
  - Applied Linear Algebra

### Graduate Courses

- 2009-Present
- Numerical Methods in Linear Algebra
  - Advanced Numerical Computations
  - Advances in Numerical Analysis
  - Introduction to Parallel Computing
  - Introduction to Integral Equations
  - Approximation Theory

## Students

### Supervisor of M.Sc. students:

- 2010-2011 **Fatemeh Shahlaei.**
- 2011-2012 **Elham Moradian.**
- 2011-2012 **Azam Zare.**
- 2010-2013 **Mohammad Hossein Norouzi.**
- 2012-2013 **Toktam Hossein Nezhad.**
- 2012-2013 **Shayesteh Tavassoli.**
- 2013-2014 **Mahdi Mohseni.**
- 2014-2015 **Fatemeh Hasan Abadi.**
- 2014-2015 **Fatemeh Rezaei Fazel.**
- 2015-2016 **Haniyeh Fereydoonfar.**
- 2015-2016 **Motahareh Ravanan.**
- 2015-2016 **Soroor Matoori.**
- 2015-2016 **Zeynab Borhani.**
- 2016-2017 **Samaneh HosseiniSani.**
- 2016-2017 **Leila Kakhki Beydokhti.**
- 2016-2017 **Haniyeh Radjabi.**
- 2016-2017 **Somayyeh HokmAbadi.**
- 2016-2017 **Javad Sharif Pirani.**
- 2017-2018 **Zohreh Shahr Aeni.**
- 2016-2018 **Masoumeh Yadegari.**
- 2018-2019 **Akram Mohammadian.**
- 2018-2021 **Seyyedabadi.**
- 2019-2021 **Zahra As'adi.**

Advisor of M.Sc. and Ph.D. students:

- 2010 **Mohsen Mosayyebi.**  
2010 **Akram Nosratipour.**  
2011 **Salimeh Khani.**  
2011 **Effat Razeghi.**  
2012 **Parvin Baghaei Shahraki.**  
2012 **Raheleh Hasan Abadi.**  
2013 **Elaheh Hashem Abadi.**  
2013 **Majid AboutalenZadeh.**  
2013 **Hamid Abbasi.**  
2016 **Amineh Izi.**  
2016 **Zeynab Barmalzan.**  
2016 **Elham Akraminia.**  
2016 **Somayyeh PourSedigh.**  
2016 **Mostafa Mousavi Moghaddam.**  
2016 **Zeynab Beyranvand.**  
2016 **Afsaneh Abedini.**  
2017 **Mohammad Javad Maleki.**  
2017 **Elham Tashakkori.**  
2017 **Ehsan AhmadZadeh.**  
2017 **Bahareh Koushki.**  
2018 **Elham Sanchouli.**  
2018 **Fatemeh Anaraki.**  
2018 **Mahboubeh Bakhsh Ali.**  
2018 **Ahmad Ramshini.**  
2019 **Reza Boroghani.**  
2019 **Maryam Eskandari.**  
2009-2011 **Naser Akhoundi , PhD.**  
2015-2018 **N. AziziZadeh, PhD.**

**Journal Papers**

1. **Rafiei, A.**, Tolve Haghighi, B., *Computing a block incomplete LU preconditioner as the by-product of block left-looking A-biconjugation process*, Journal of New Researches in Mathematics, in Persian, 5(18), 49-64 (2019)
2. **Rafiei, A.**, Bollhoefer, M., Benkhaldoun, F., *A block version of left-looking AINV preconditioner with one by one or two by two block pivots*. Applied Mathematics and Computations, 350, 366-385 (2019) (ISI)
3. **Rafiei, A.**, Bollhöfer, M.,: *Complete pivoting strategy for the IUL preconditioner obtained from Backward Factored AApproximate INVerse process*. Bulletin of the Iranian Mathematical Society, 43(5), 1417 – 1456 (2017) (ISI)

4. Khojasteh, D., **Rafiei, A.**, Roohani, H.: *ILU Preconditioning Based on the FAPINV Algorithm*. *Opuscula Mathematica*, 5(2), 235-250 (2015).
5. **Rafiei, A.**, Tolue, B., Bollhoefer, M., *Complete Pivoting strategy for the Left-looking Robust Incomplete Factorization preconditioner*. *Computers and Mathematics with applications*, 67(11), 2055–2070 (2014). (ISI)
6. **Rafiei, A.**, *Left-looking version of AINV preconditioner with complete pivoting strategy*. *Linear Algebra and its Applications*, 445, 103–126 (2014). (ISI)
7. **Rafiei, A.**: *ILU and IUL factorizations obtained from Forward and Backward Factored Approximate INVerse algorithm*, *Bulletin of the Iranian Mathematical Society*, 40(5), 1327–1346 (2014). (ISI)
8. **Rafiei, A.**, *A complete pivoting strategy for the right-looking Robust Incomplete Factorization preconditioner*. *Computers and Mathematics with applications*, 64, 2682–2694 (2012). (ISI)
9. **Rafiei, A.**, Shahlaei, F., *Different versions of ILU and IUL Factorizations obtained from Forward and Backward Factored Approximate Inverse Processes- Part I*. *Advances in Numerical Analysis*, Volume 2011, Article ID: 703435, 9 pages.
10. **Rafiei, A.**: *A hybrid preconditioner to solve nonsymmetric linear system of equations*, *Journal of Advanced Research in Scientific Computing*, 3(4), 57–97 (2011).
11. **Rafiei, A.**, Bollhöfer, M.: *Robust Incomplete Factorization for Nonsymmetric matrices*. *Numerische Mathematik*, 118(2), 247–269 (2011). (ISI)
12. **Rafiei, A.**, Toutounian, F.: *Breakdown-free version of ILU factorization for nonsymmetric positive definite matrices*. *Journal of Computational and Applied Mathematics*, 230, 699–705 (2009). (ISI)
13. **Rafiei, A.**, Toutounian, F.: *New breakdown-free variant of AINV method for nonsymmetric positive definite matrices*. *Journal of Computational and Applied Mathematics*, 219(1), 72–80 (2008). (ISI)

## Conference Papers

1. **Rafiei, A.**, *A nonsymmetric approximate inverse preconditioner with block structure*. The International Conference on Preconditioning Techniques for Scientific and Industrial Applications, July 31- August 2, 2017. Canada. (Participation cancelled because of a latency in visa application).
2. **Rafiei, A.**, Kakhki Beydokhti, L., *Right-looking approximate*, *47th Annual Iranian Mathematics Conference*, August 22-25, 2017, Bu Ali Sina University, Hamedan, Iran.
3. **Rafiei, A.**, Kakhki Beydokhti, L., *A block version of right-looking A-biconjugation process*. *9th Seminar on linear algebra and its applications*, July 5-6, 2017, Tabriz University, Iran.
4. **Rafiei, A.**, Hosseini Sani, S., *Left-looking AINV preconditioner in block form*. *9th Seminar on linear algebra and its applications*, July 5-6, 2017, Tabriz University, Iran.
5. **Rafiei, A.**, Bollhoefer, M., and Huckle, T., *A block factorization format for the inverse of a nonsymmetric matrix*. *47th Annual Iranian Mathematics Conference*, 28-31 August 2016, Kharazmi University, Iran.
6. **Rafiei, A.**, Bollhoefer, M., *Extending the pivoting strategy of Backward IJK version of Gaussian Elimination to an IUL preconditioner*. The International Conference on Preconditioning Techniques for Scientific and Industrial Applications, June 17-19, 2015, Eindhoven, The Netherlands.
7. **Rafiei, A.**, Bollhoefer, M., *Pivoting strategy for the right-looking version of RIF – Ns preconditioner*. GAMM workshop, Applied and Numerical Linear Algebra 2015, July 9-10, 2015, Magdeburg, Germany.
8. **Rafiei, A.**, Rezaei, F., *Complete pivoting strategy to compute the IULBF preconditioner*. *46th*

- Annual Iranian Mathematics Conference, 25-28 August 2015, Yazd University, Iran.
9. **Rafiei, A.**, Mohseni, M. and Rezaei, F., *Pivoting strategy for an ILU preconditioner*. 46th Annual Iranian Mathematics Conference, 25-28 August 2015, Yazd University, Iran.
  10. **Rafiei, A.**, *Left-looking version of RIF preconditioner with complete pivoting strategy*, The 7th Seminar on Linear Algebra and its Applications, 26-27th February 2014, Ferdowsi University of Mashhad, Iran.
  11. **Rafiei, A.**, Azadi, M., *Solving the Sylvester matrix equation by the Global Transpose-Free Quasi-Minimal Residual Method*, 44th Annual Iranian Mathematics Conference, 27-30 August 2013, Ferdowsi University of Mashhad, Iran. (Accepted as a Poster)
  12. **Rafiei, A.**, Moradian, E., *Complete pivoting strategy for the left-looking version of AINV preconditioner*, 44th Annual Iranian Mathematics Conference, 27-30 August 2013, Ferdowsi University of Mashhad, Iran.
  13. Zare, A., **Rafiei, A.**, *Right-looking version of robust incomplete factorization preconditioner with pivoting*, 43rd Annual Iranian Mathematics Conference, 27-30 August 2012, University of Tabriz, Iran. (Accepted as a Poster)
  14. Shahlaei, F., **Rafiei, A.**, *Different dropping strategies in the ILUFF algorithm*, 42nd Annual Iranian Mathematics Conference, 5-8 September 2011, Vali-e-Asr University of Rafsanjan, Iran.
  15. Shahlaei, F., **Rafiei, A.**, *Computing the ILU decomposition as by-product of the Backward Fctored AProximate INVerse process*, 6th International Seminar on Linear Algebra and its applications. 5-6 June 2011, Arak University, Iran. (In Persian)
  16. **Rafiei, A.**, *Efficient dropping technique for ILU and IUL factorizations obtained as by-products of FFAPINV and BFAPINV algorithms*. International Conference on Preconditioning Techniques For Scientific And Industrial Applications. May 16-18, 2011. Bordeaux, France. (participation cancelled).

## Workshops and Schools

- 2014 **Computing packages for Numerical Linear Algebra**, *Shahid Bahonar University of Kerman*, Iran.
- 2014 **Application of Group theory in Cardiography**, *Ferdowsi University of Mashhad*, Iran.
- 2015 **GAMM workshop – applied and numerical linear algebra**, *Max Planck Institute for Dynamics of Complex Technical Systems*, Magdeburg, Germany.
- 2016 **Wrokshop on optimization and its application in Medicine**, *Institute for Research in Fundamental Sciences*, Tehran, Iran.
- 2016 **Parallel computing workshop**, *Kharazmi University*, Karaj, Iran.
- 2017 **Mathematical Modeling and Scientific Computing**, *Hakim Sabzevari University*, Sabzevar, Iran.
- 2021 **Introduction to using Firedrake on ARCHER2**, *Imperial College of London*, UK.
- 2021 **Solving large systems efficiently in multiphysics numerical simulations**, *Centre de recherches mathematiques*, Université Laval, Canada.
- 2022 **17th Copper Mountain Conference On Iterative Methods**, *The University of Colorado*, USA.

## Academic References

- Prof. Matthias Bollhoefer. Technische Universitat Braunschweig, Germany (m.bollhoefer@tu-bs.de)
- Prof. Fred Wubs. University of Groningen, The Netherlands (f.w.wubs@rug.nl)
- Prof. Fayssal Benkhaldoun. Paris 13 University, France. (fayssal@math.univ-paris13.fr)
- Prof. Scott MacLachlan . Memorial University of Newfoundland, Canada. (smaclachlan@mun.ca)