

Hazem Mohamed Bahig

Current Job : Associate Professor of Computer Science
Information and Computer Science Department, College of Computer
Science and Engineering, Hai'l University, KSA

E-mail : bahig@uoh.edu.sa

Specilization : High Performance Computing

Education (Higher Degree)

1. B.Sc. in Pure Mathematics and Computer Science, excellent with honor degree, May 1990. Faculty of Science, Ain Shams University, Cairo, Egypt.
2. M.Sc. courses in Computer Science, Oct. 1991- Sept. 1992, Faculty of Science, Ain Shams University, Cairo, Egypt.
3. M.Sc. in Computer Science, 10/1997, Faculty of Science, Ain Shams University, Cairo, Egypt.
4. Ph.D. in Computer Science, 11/2003, Faculty of Science, Ain Shams University, Cairo, Egypt.

Research Interest

- High Performance Computing.
- Design and analysis of algorithms.
- Discrete Mathematics.
- Computational Science
- Optimization
- Bioinformatics.
- Cryptographic algorithms
- Intelligent Techniques for Computational Science, especially for optimization.
- E-learning System for algorithms.

List of Scientific Publications

1. Abdelsalam, K.M.K., Khamis, S.M., Bahig, H.M., **Hazem M. Bahig**. A multicore-based algorithm for optimal multi-way number partitioning. International Journal of Information Technlongy,15, 2929–2940, 2023.
2. **Hazem M. Bahig**, Khaled A. Fathy. Sequential and parallel sliding window algorithms for multiplying large integers. Journal of King Saud University - Computer and Information Sciences, Vol 35 (3), 131-140, 2023.
3. **Hazem M. Bahig**, Mohamed A. G. Hazber, Khaled Al-Utaibi, Dieaa I. Nassr, and Hatem M. Bahig. 2022. "Efficient Sequential and Parallel Prime Sieve Algorithms" *Symmetry* 14, no. 12: 2527.
4. Suha S.A. Shokr, **Hazem M. Bahig**. A Fast Multicore-based Window Entropy Algorithm. International Journal of Advanced Computer Science and Applications(IJACSA), 13(11), 2022.
5. **Hazem M Bahig**, Khaled A. Fathy. An Improved Parallel Prefix Sums Algorithm. Parallel Processing Letters, Vol. 32, No. 03n04, 2022, World Scientific
6. Hatem M. Bahig, Dieaa I. Nassr, Mohammed A. Mahdi, and **Hazem M. Bahig**. Small Private

- Exponent Attacks on RSA using Continued Fractions and Multicore Systems. *Symmetry*. 2022; 14(9):1897
7. Tarek G. Kenawy, Mohammad H. Abdel-Rahman, **Hazem M. Bahig**. A Fast Longest Crossing-Plain Preserving Common Subsequence Algorithm. *International Journal of Information Technology*, 2022, Springer
 8. **Hazem M Bahig**, Nassr, D.I., Mahdi, M.A. et al. Speeding up wheel factoring method. *J Supercomputing*, 2022, Springer.
 9. **Hazem M Bahig**, Khaled A. Fathy. An efficient parallel strategy for high-cost prefix operation. *J Supercomputing* 77, 5267–5288, 2021.
 10. **Hazem M Bahig**, Hatem M Bahig, Khaled A Fathy. Fast and scalable algorithm for product large data on multicore system. *Concurrency and Computation: Practice and Experience*, Vol 33, Issue 2, 2021 Wiley.
 11. **Hazem M Bahig**, K.A. Alutaibi, M. A. Mahdi, A. AlGhadhban, Hatem Bahig. An evolutionary algorithm for short addition chains. *International Journal of Advanced Computer Science and Applications*, 11(12), 476-485, 2020.
 12. **Hazem M Bahig**, M. A. Mahdi, K.A. Alutaibi, A. AlGhadhban, Hatem Bahig. Performance Analysis of Fermat Factorization Algorithms. *International Journal of Advanced Computer Science and Applications*, 11(12), 340-352, 2020.
 13. **Hazem M Bahig**, A. AlGhadhban, M. A. Mahdi, K.A. Alutaibi, Hatem Bahig. Speeding up the Multiplication Algorithm for Large Integers. *Engineering, Technology & Applied Science Research*, Vol. 10 No. 6, 6533-6541, 2020.
 14. **Hazem M Bahig**, Hatem M Bahig, Yasser Kotb. Fermat Factorization using a Multi-Core System. *International Journal of Advanced Computer Science and Applications* 11(4), 323-330, 2020.
 15. **Hazem M Bahig**. Complexity Analysis and Performance of Double Hashing Sort Algorithm. *Journal of the Egyptian Mathematical Society*, 27:3, 2019, Springer.
 16. **Hazem M Bahig**, Yasser Kotb. An Efficient Multicore Algorithm for Minimal Length Addition Chains. *Computers* 8(1): 23, 2019, MDPI.
 17. **Hazem M Bahig**, Yasser Kotb. A Multicore Exact Algorithm for Addition Sequence. *Journal of Computers*, 14(1), 79-87, 2019.
 18. **Hazem M. Bahig**. A New Constant-Time Parallel Algorithm for Merging. *The Journal of Supercomputing*, 75(2), 968–983, 2019. Springer.
 19. Khaled A. Fathy, **Hazem M. Bahig**, M. Farag. Speeding up Multi-exponentiation on Multicore System. *Journal of the Egyptian Mathematical Society*, 26(2), 235-244, 2018.
 20. **Hazem M. Bahig** and M Abbas. A Scalable Parallel Algorithm for Turnpike Problem. *Journal of the Egyptian Mathematical Society*, 26(1), 18-26, 2018.
 21. Khaled A. Fathy, **Hazem M. Bahig**, A. A. Ragab. A Fast Parallel Modular Exponentiation Algorithm. *Arabian Journal for Science and Engineering*, 43(2), 903–911, 2018, Springer.
 22. **Hazem M. Bahig**. A Fast Optimal Parallel Algorithm for a Short Addition Chain. *The Journal of Supercomputing*, 74(1): 324-333, 2018, Springer.
 23. Mohamed Ali Ahmed, **Hazem M. Bahig**, Hassan Al-Mahdi. Recent Approaches to Enhance the Efficiency of Ultra-Wide Band MAC Protocols. *International Journal of Advanced Computer Science and Applications*, 8(12), 404-410, 2017.
 24. Ahmed Y Khedr and **Hazem M Bahig**. Debugging Tool to Learn Algorithms: A Case Study Minimal Spanning Tree. *International Journal of Emerging Technologies in Learning*, 12(4), 90-100, 2017.
 25. **Hazem M. Bahig**, Mostafa M. Abbas, M. M. Mohie-Eldin: Parallelizing Partial Digest Problem on Multicore System. 5th International Work-Conference Bioinformatics and Biomedical Engineering, IWBBIO 2017, Granada, Spain, April 26-28, 2017, *Lecture Notes in Bioinformatics*, Vol 10209, 95-104, Springer.
 26. **Hazem M Bahig**, Ahmed Y Khedr. MoniTDP: A Tool for Monitoring the Tracing of

- Dynamic Programing Algorithms. *Computer Applications in Engineering Education*, 25(2), 179–187, 2017, Wiley.
27. Mostafa M. Abbas and **Hazem M. Bahig**. A Fast Exact Sequential Algorithm for Partial Digest Problem. *BMC Bioinformatics*, 17(S-19): 139-148, 2016, Springer.
 28. **Hazem M Bahig** and Ahmed Y Khedr. Parallelizing k-way merging. *International Journal of Computer Science and Information Security*, Vol. 14 No. 4, 497-503, APRIL 2016.
 29. Mostafa M. Abbas, **Hazem M. Bahig**, Mohamed Abouelhoda, M. M. Mohie-Eldin. Parallelizing Exact Motif Finding Algorithms on Multi-core. *The Journal of Supercomputing* 69(2): 814-826, 2014, Springer.
 30. Mostafa M. Abbas, **Hazem M. Bahig**: An Efficient Algorithm to Identify DNA Motifs. *Mathematics in Computer Science* 7(4): 387-399 (2013), Springer.
 31. Mostafa M Abbas, Mohamed Abouelhoda and **Hazem M Bahig**. A Hybrid Method for the Exact Planted (l, d) Motif Finding Problem and its Parallelization. *BMC Bioinformatics*, 13(Suppl 17):s10, 2012, Springer.
 32. Khaled Fathy, **Hazem M. Bahig**, Hatem Bahig and A. Ragab. Binary Addition Chain on EREW PRAM, *Lecture Notes in Computer Science*, Vol. 7017, 321-330, 2011, Springer.
 33. **Hazem M. Bahig**. Integer Merging on EREW PRAM. *Computing* 91(4): 365-378, 2011, Springer.
 34. Hatem Bahig and **Hazem M. Bahig**. A new strategy for generating shortest addition sequences. *Computing* 91(3): 285-306, 2011, Springer.
 35. **Hazem M. Bahig**, M. Abbas, and A. Bhery. Experimental Study of Modified Voting Algorithm for Planted (l,d)-Motif Problem. *Advances in Experimental Medicine and Biology*, especial issue in *Advances in Computational Biology*, Vol. 680, 65-73, 2010, Springer.
 36. **Hazem M. Bahig**. Merging Data Records on EREW PRAM. *Lecture Notes in Computer Science*, Vol. 6082, 401- 410, 2010, Springer.
 37. M. Abbas and **H. M. Bahig**. Performance and Analysis of Modified Voting Algorithm for Planted Motif Search. In *2009 ACS/IEEE International Conference on Computer Systems and Applications. IEEE Computer Society Proceeding*, 725-731, May 10-13, 2009, Rabat, Morocco.
 38. **Hazem M. Bahig**. Extend Input Domain for Integer Sorting on Sum CRCW PRAM. *The 6th International Conference on Informatics and Systems*, PAR-1-PAR-6, March 27-29, 2008, Cairo, Egypt.
 39. **Hazem M. Bahig** and Hatem Bahig. Merging on PRAM. *International Journal of Computers and Applications*, especial Issue in High Performance Computing Architectures Vol. 30, No. 1, 51-55, 2008. ACTA Press.
 40. **Hazem M. Bahig**. Parallel Merging with Restriction. *The Journal of Supercomputing*, 43(1), 99-104, 2008. Springer.
 41. **Hazem M. Bahig** and Hatem Bahig. Optimal Parallel Merging by Counting. *Fourth International Conference on Information Technology: New Generations*. IEEE Computer Society Proceeding. Vol. 2, 637-642, April 2-4, 2007, Las Vegas, Nevada, USA.
 42. Hatem Bahig and **Hazem M. Bahig**. Speeding Up Evaluation of Powers and Monomials. *The 2006 International Conference on Foundation of Computer Science*. Las Vegas, Nevada, USA, June 26-29, 2006, CSREA Press.
 43. **Hazem M. Bahig**. Comments on Integer Sorting on Sum-CRCW. *The 2006 International Conference on Parallel and Distributed Processing Techniques and Applications*, 637-639, June 26-29, 2006, Las Vegas, Nevada, USA, CSREA Press.
 44. **Hazem M. Bahig** and S. Daoud. "Practical Integer Sorting for Shared Memory". *Lecture Notes of Computer Science*, Vol. 3726, 281-286, Springer.
 45. **Hazem M. Bahig**, S. Daoud and M. Khairat. "Parallel Self-Index Integer Sorting". *The Journal of Supercomputing*, Vol. 22, No. 3, 269-275, 2002, Springer. (IF 2.16, ISI, Scopus)
 46. M. Khairat, S. Daoud and **Hazem M. Bahig**. "Optimal Parallel Integer Sorting on EREW PRAM". In *Proc. of the 2000 Symposium on Performance Evaluation of Computer and*

Telecommunication Systems, 370-374, British Columbia, Canada.

47. M. Khairat, S. Daoud and **Hazem M. Bahig**. "Parallel Integer Sorting of Digitalized Information". In *7th Scientific Conference for Information Systems and Computer Technology*. Feb. 2000, Egypt.
48. M. Khairat, M. El-Zahar and **Hazem M. Bahig**. "An Exact Graph Coloring Algorithm Using Color Exchange". *Journal of the Egyptian Mathematical Society*. 5(1), 65-71, 1997.

Projects

1. Design an efficient strategy to detect DNA motifs using soft computing techniques, (Hail University, Co.I, 2011).
2. Design a fast merging algorithm on parallel model, (Hail University, PI, 2013).
3. Design a visualize software for algorithm course, (Hail University, CoI, 2013).
4. An efficient algorithm to reconstruct the location of restriction sites in DNA, (Hail University, PI, 2016).
5. An efficient minimal length addition chain on multi-core system, (KACST, PI, 2016).
6. Improved Integer Factorization Algorithm Using High Performance Systems (Hail University, PI, 2019).
7. Uses of Artificial Intelligence in Encryptions (Hail University, PI, 2020)
8. Design and Cryptoanalysis of some cryptosystems (Hail University, PI, 2021)
9. An Improved Entropy-based Malware Analysis Method (Hail University, PI, 2022 – Posgraduate Students)
10. An Intelligent Technique for Outsourcing Protocols Based on Group Exponentiation (Hail University, PI, 11/2022).
11. An Efficient Parallel Technique for Matching Strings. (Hail University, PI, 11/2022).
12. Optimize Factoring Method and Its Applications. (Hail University, PI 8/2023)
13. Improving the Performance and Attack of Cryptographic Systems and Protocols (Hail University, PI 8/2023)

M.Sc. Students

1. Ibrahim Gad . Resresearch area is parallel algorithms (Factorization).
2. Khalid Fathy. Resresearch area is parallel algorithms (Addition chain & Parallelism).
3. Mostafa Abbass Resresearch area is bioinformatics algorithms (DNA Motif).
4. Tarek Genawy . Resresearch area is bioinformtics algorithms (RNA Comparison).
5. Kamel Abdelsalam . Resresearch area is parallel algorithms on optimization problems.
6. M. Aref. Research area is cybersecurity.
7. S. Shukr. Research area is cybersecurity.

Ph.D. Students

1. Khalid Fathy. Resresearch Area is parallel algorithms (Modular exponentiation).
2. Mostafa Abbass Resresearch Area is bioinformatics algorithms (DNA Motif & Parallelism).

Training in Development Academic Staff

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| 1. Preparation of a research project. | (3 days) |
| 2. Credit hours system. | (3 days) |
| 3. Management of scientific research. | (3 days) |
| 4. Ethics of scientific research. | (3 days) |
| 5. Communication skills in different types of education. | (3 days) |
| 6. Organization of scientific conferences. | (3 days) |
| 7. International publishing for scientific research | (2 days) |

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| 8. University administration. | (2 days) |
| 9. Strategic planning | (2 days) |
| 10. Time management and meetings | (2 days) |
| 11. Financial and legal aspects in the university works | (2 days) |
| 12. Problem solving and decision making | (2 days) |

Workshops in Quality Assurance

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| 1. Academic standard. | (1 day) |
| 2. Course specification and report. | (1 day) |
| 3. Local Accreditation Requirements | (2 days) |
| 4. International Accreditation Requirements. | (2 days) |
| 5. Measurement of intended learning outcomes of courses in the electronic form | (1 day) |
| 6. Standards, mechanisms and practices for quality. | (1 day) |

Scientific Workshops

1. Grid Computing and Distributed Object-Oriented Parallelism. Jan 4, 2006, American University of Beirut, Lebanon.
2. MIMD Programming, Jan 5, 2006, American University of Beirut, Lebanon.
3. High Performance Computing: LINKSCEEM, Jan 28, 2010, Nile University, Egypt.
4. Workshop on Intelligent System and Application, March 6, 2010, Al-Fayoum University.
5. 99Developing research skills in the Kingdom: from the idea to the output, 2014.