

# Essam Morsi

## Profile of qualifications

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- Ph.D. degree of computer engineering with computational science & data science experience
- Extensive experience in HPC on x86 modern processors & Nvidia GPUs
- AI academic and professional experience with technical expertise in O&G reservoir and VMs memory bitmap analysis
- Solid knowledge in cloud computing & virtualization, distributed and parallel systems architecture

## Work Experience

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### **Brightskies Tech. co.**

#### **Senior HPC systems engineer - [HPC Team Lead]**

**Feb 2016 - Oct 2019**

- On-site technical support and code optimization
  - Seismic-based code optimization: PSTM, PsDM, RTM & FWI
  - Propose and develop an algorithmic-based optimization ideas such as a novel PsTM algorithm achieved 10x speedup and IA x86-based extension to the patch Eikonal solver [presented @ IXPUG 2018]
  - Implement and optimized RTM with memory snapshots, for different memory hierarchy and IOs, using the recently developed Intel's IPP AVX512 [presented @ IXPUG 2018 & ISC-Asia 2018]
  - Implement and compare Sponge, CPML and random-velocities ABCs to find the best compromise between geophysical and computational standpoints [presented @ Saudi-HPC 2019]
  - Initiate and proof an optimization idea for reservoir simulator using machine learning techniques for Aramco's GigaPower simulation team: significant reduction of realization/runs and hence multiple Xs speedup
  - Linear algebra based code optimization: VML, cu/BLAS, LAPACK, MKL.
  - Tree-based load balancing algorithm for reservoir simulator
- Linux server administration & HPC infrastructure management:
  - HPC software stack on UNIX and Linux operating systems
  - Problems troubleshooting, identification & solving
  - Benchmarking system performance and resolving any bottlenecks impacting the overall performance

**Nov 2009 - Oct 2012**

### **ICTP, PMU, Ministry of High Education, Giza**

#### **Technical Coordinator**

Participate in the following technical task:

- Design and Develop arabic name matching algorithm
- Portal project Business analysis Technical committee member
- Develop Live@edu Mail ID Authentication web service for Egyptian universities
- Design/Develop required programs for evaluating the Egyptian universities statistical information

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## Education

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**Nov 2019 - Present**  
**Postdoc. researcher, Inria [DataMove & Sequel teams]:** High Performance Deep Reinforcement Learning

**Feb 2013 - Nov 2017**  
**Ph.D., Egypt-Japan University for Science and Technology (E-JUST):** A Generic Traffic Approach for Synthesization, Monitoring and Forecasting: An Application of Cellular Big-Data on Dakar, Senegal

**Mar 2015 - Nov 2015**  
**Visiting research fellow,** Green Computing Lab [Kasahara's Lab] - Waseda University, Japan

**Feb 2011 - Oct 2012**  
**M.Sc., Computer Engineering Department, Faculty of engineering - Benha university, Egypt:** Harvesting Unused Resources for Cloud Computing

**Sep 2005 - Jul 2009**  
**B.Sc., Computer Engineering Department, Faculty of engineering - Benha university, Egypt:**

- Grade: V. good with honor (Ranked: 1st)
- Project: Document Based Business Management

## Teaching Experience

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**Focus on teaching two main tracks for undergraduate and post-graduate students:**

- **AI concepts & statistical learning**
- **Parallel and distributed systems, architecture & programming models**

**Sep 2017 - Oct 2019**  
Benha University, Faculty of engineering  
*Assistant Professor - Dept of Computer Engineering*

**Sep 2010 - Feb 2013**  
Benha University, Faculty of engineering  
*Lecturer assistant - Dept of Computer Engineering*

## Programming & HPC Skills:

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Languages: C/C++, Fortran, Python, R, Java & bash scripting  
OpenMP, MPI, CUDA, OpenAcc  
ML: Pandas, Scikit, TensorFlow, PyTorch  
Profiling: Intel vTune Amplifier & advisor,  
valgrind, gperf, oprofile & perf  
Compilers: ICC, GNU GCC & PGI

## Training

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EMC, Smart Village, Egypt  
*EMC Academic Alliance program [Information Storage & Management]*

Dec 2009

Education Partner Airlift - Microsoft Egypt  
*Live@edu & Microsoft Learning Gateway*

Oct 2009

## Publications

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- [1] P. Thierry, S. Gogar, M. Gontier, A. Villarreal, Y. Zavarzin, S. Khlystov, L. Borges, and E. Algizawy, "Evaluation of compression algorithms and memory hierarchies impact within time reversal algorithms," in *2019 SIAM Conference on Computational Science and Engineering*, Washington, USA, Feb. 2019.
- [2] E. Algizawy, T. Ogawa, and A. El-Mahdy, "Real-time large-scale map matching using mobile phone data," *ACM Trans. Knowl. Discov. Data*, vol. 11, no. 4, pp. 52:1-52:38, Jul. 2017.
- [3] A. El-Mahdy, H. ElShishiny, and E. Algizawy, "Smart traffic framework based on dynamic mobile clusters," in *2014 IEEE 3rd International Conference on Cloud Networking (CloudNet) (CLOUDNET'14)*, Luxembourg, Luxembourg, Oct. 2014.
- [4] A. Ahmed, A. Alsammak, and E. Algizawy, "A new approach to manage and utilize cloud computing underused resources," *International Journal of Computer Applications*, vol. 76, no. 11, pp. 29-36, Aug 2013.
- [5] K. Metwaly, K. Elamrawi, E. Algizawy, M. Mahmoud, M. ElBasyouni, and P. Thierry, "Accelerated reverse time migration with optimized io," in *2018 ISC High Performance - Asia [poster]*, Frankfurt, Germany, Jun. 2018.
- [6] E. Algizawy, K. Elamrawi, K. Morad, I. Monir, M. ElBasyouni, K. Metwaly, and P. Thierry, "Highly scalable flexi-trace-based pre-stack time migration," in *IXPUG - 1st Middle East Meeting [poster]*, KAUST, Saudi Arabia, Jun. 2018.
- [7] K. Metwaly, K. Elamrawi, E. Algizawy, M. Mahmoud, M. ElBasyouni, and P. Thierry, "Accelerated reverse time migration with optimized io," in *2017 Intel HPC Developer Conference [poster]*, Denver, USA, Nov. 2017.
- [8] H. El-Shishiny, E. Algizawy, A. El-Mahdy, and M. Baddar, "Road traffic time series analysis, modelling and forecasting based on mobile phonenetwork data," in *ITISE 2016 [poster]*, Granada, Spain, Jun. 2016.
- [9] A. Elmahdy, E. Algizawy, T. Ogawa, H. El-Shishiny, and M. Baddar, "High resolution traffic maps generation using cellular big data," in *Proceedings of the 2015 Net.Mob international conference - D4D [poster]*, 2015.

## Research Projects

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Sep 2014 - May 2015  
**Waseda University, IBM Egypt, and E-JUST University**  
**Orange D4D - Road-Level Vehicle Trip Route Determination Using Cellular Big Data:** For the first time, mobile call details ( Senegal/Orange Sonata) utilized at a 'microscopic' traffic level analysis, modeling and prediction.

Jan 2011  
**Benha University, Faculty of engineering, Cairo**  
**HP Cloud Computing lab proposal:** Participate in preparing cloud computing lab proposal that aid our students in the implementation and host of computer application that raise their capabilities in dealing with Grid/Cloud computing techniques effectively

Jun 2010  
**ITIDA Research Project Proposal**  
*Effectiveness and Cost Benefits of cloud Computing-Based system for managing universities information system application*

## Development Projects

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Nov 2011  
**Benha University, Faculty of engineering, Cairo**  
**Laboratories Control System:** Design and develop Laboratories control system. The LCS system aims to serve the faculty departments labs maintainable, and scheduling to keep them fully functional using a complete ASP.net web Solution.

Jan 2012  
**Benha University, Faculty of engineering, Cairo**  
**Courses Specification and Reporting Web Site:** Design and develop course specifications web site that helps teaching staff to provide the proficiency and experience necessary for carrying out of undergrad and research purposes, based on specifications stipulated for basic and advanced level university education.

## Languages & Interests

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Arabic: Mother Tongue.  
English: Fluent.  
Interests: Reading historical and romantic stories & playing tennis table and chess & charity activities

## References

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- Dr. Philippe Thierry - philippe.thierry@intel.com [Mentor & collaborator]
- Dr. Khaled Elamrawi - khaled.elamrawi@brightskiesinc.com [ex-Manager]
- Prof. Tetsuji Ogawa - ogawa@pcl.cs.waseda.ac.jp [Advisor]