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(Moez A. AbdelGawad)
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Assistant Professor, Informatics Research Institute (IRI), SRTA-City, Alexandria, Egypt.
Remote Visiting Scientist, Computer Science Dept., Rice University, USA (2020–2025).
Ph.D., Computer Science, Rice University, Houston TX, USA (2011).
Adjunct Asst. Prof., CSE Dept., Faculty of Engineering, Alexandria University, Egypt (2019–2024).

Latest (Mar. 2022–Mar. 2024):

- Author of QAL (Quantum Algorithms Lab), an innovative visual interactive app for analyzing quantum algorithms. QAL includes novel *patentable* software technologies. (QAL Lite, a lightweight version of QAL, is freely available online.)

Research Interests: Quantum Algorithms & Informatics · OOP Type Systems · Applied Category Theory

Select Publications

- Moez A. AbdelGawad. Using Category Theory in Modeling Generics in OOP (Modeling Object-Oriented Generics: An Order-Theoretic and Category-Theoretic Approach). The Applied Category Theory Conference (ACT'19), Quantum Group, Dept. of Computer Science, Oxford University, UK, July 15-19th, 2019. (Extended abstract. Poster presentation)
- Moez A. AbdelGawad. Towards a Java Subtyping Operad. Formal Techniques for Java-like Programs (FTfJP'17), European Conference on Object-Oriented Programming (ECOOP'17), Barcelona, Spain, June 18-23, 2017.
- Moez A. AbdelGawad (and Robert Cartwright). A Domain-Theoretic Model of Nominally-Typed Object-Oriented Programming. Journal of Electronic Notes in Theoretical Computer Science (ENTCS), Vol. 301, pp. 3-19, 2014.
- Moez A. Abdel-Gawad, Ahmed A. Belal. 2D-Encryption Mode (2DEM). Proceedings of SPIE's 2002 annual conference on Mathematics of Data/Image Coding, Compression, and Encryption V, with Applications, Seattle, USA, 2003.
- Multiple (20+) research articles and technical reports (on arXiv and elsewhere) on modeling OOP generics and Java wildcards, domain theory, the Coq proof assistant, partial graph products, and on induction, coinduction, and fixedpoints.

Teaching Interests

- *Graduate and Undergraduate*: Quantum Programming · Advanced Object-Oriented Programming (OOP) · Algorithms · Linear Algebra · Discrete Mathematics (*e.g.*, Group Theory, Set Theory, Lattice Theory, ... etc.) · Applied Category Theory · Building Visual Interactive Apps · 3D Animation and Visualization (incl. VR and AR) · Games Programming · A.I./Machine Learning.
- *Graduate*: Quantum Algorithms · Quantum Informatics · OOP Type Systems · Security Algorithms.

Teaching Experience

- Quantum Computing Training Programme ('The QC Game') @ Informatics Research Institute (IRI) - SRTA-City. (Undergraduate. Feb. 2022. Programme posters are available online)
- Quantum Programming @ CSE Dept., Fac. of Engineering - Alexandria Univ. (Graduate. Fall 2019. Course material is freely available online, and has been widely appreciated around the globe.)
- Advanced Compilers (Automatic Software Parallelization) @ Computer Science and Engineering Dept. - Egypt-Japan Univ. of Sci. & Tech. (EJUST). (Graduate. Spring 2014)

- Supervised the Order Theory in Proof Designer (OTPD) B.Sc. Computer Science graduation project @ CSE Dept., Fac. of Engineering - Alexandria Univ. (Undergraduate. 2009-2010)
- Multiple (30+) invited talks; on quantum algorithms, modeling OOP type systems, domain theory, OOP & functional programming (Java and Scala), proof assistants, and encryption modes.

Further Research Experience

- Visiting Research Scholar @ Category Theory Group (w/ Prof. Qingguo Li), College of Mathematics, Hunan University, Changsha, China (One year. 2015-2016).
- Summer Internship @ Programming Languages Group (w/ Prof. Martin Odersky—chief Scala architect), Ecole Polytechnique Federale - Lausanne (EPFL), Switzerland (Six months. 2005).
- Authoring several *research proposals*, on: (1) modeling Java generics (PI. 2015; accepted for STDF funding), (2) automatic software parallelization (Co-PI, with Prof. Ahmed Elmahdy @ EJUST as PI. 2015; accepted for STDF funding), (3) using quantum computing and supercomputers to analyze the spread of covid-19 (PI, with multiple Alex. Univ. professors and students in medical and engineering sciences. 2020), and others.

Books

- Robert Cartwright, Rebecca Parsons, Moez A. AbdelGawad. Domain Theory: An Introduction. (Under preparation). Draft available at arXiv.org: 1605.05858 [cs.PL], 2016.
- Moez A. AbdelGawad. NOOP: A Nominal Mathematical Model of Object-Oriented Programming. ISBN: 978-3-639-51281-6. Scholars' Press, 2013.

Miscellaneous

- *Education*

  Ph.D.: '*NOOP*: A Mathematical Model of OOP' (OOP Type Systems), CS Dept., Rice University, USA.

  M.Sc.: '2D Encryption Mode (2DEM)' (Security Algorithms), CS Dept., Faculty of Engineering, Alexandria University, Egypt.

  B.Sc.: 'Human Face Recognition' (Digital Image Processing, Neural Networks), CS Dept., Faculty of Engineering, Alexandria University, Egypt.

- *Other Contact Info*: QAL@rice.edu, moez.qal@srtacity.sci.eg, quantum.computing@rice.edu, moez@rice.edu, moezadel@live.com
- *Programming Languages and Technologies*: Java, Python (NumPy, SciPy, Matplotlib, Jupyter, etc.), C, C++, C#, JavaScript/TypeScript/Node.js, Julia, Scala, Kotlin, Haskell, OCaml/ML, Lisp/Scheme, Pascal/Delphi, COBOL, FORTRAN, SageMath, Matlab, Mathematica, VB/VBA, SQL, XML/XSLT, HTML5, 3D Graphics (WebGL, WebGPU, and WebXR), Blender, React/React Three Fiber, various scripting languages and assembly languages.
- *Natural Languages*: Arabic (Native), English (Fluent/Near Native), French (Moyen), German (Ein bisschen).
- *Personal*: Born in Jülich, (West) Germany (2 years). Lived in: Sheffield, UK (4 years); Houston, TX, US (7 years); Lausanne, Switzerland (6 months); Changsha, China (1 year). Performed *Hajj* in 2006. Briefly visited Hong Kong (2015), Jordan (2006), KSA (2006), Germany (2005), France (2005), and Qatar (2013).