Alie El-Din Mady

Cork Complex Systems Laboratory (CCSL)
Department of Computer Science
University College Cork (UCC)
Western Gateway Building, Western Road
Cork, Ireland

RESEARCH
INTEREST

Embedded System, HDL Design, Digital Circuit Design, System On Chip, Computer Architecture, Hybrid System and Wireless Sensor Network.

EDUCATION

Ph.D. in Computer Science   ***Ongoing***
University College Cork (UCC), Department of Computer Science, Cork Complex Systems Laboratory (CCSL), Cork, Ireland, Oct. 2008 - *Ongoing*.
Thesis: *Embedded Middleware Design for Optimised Building Operations.*
Mentor: Prof. Gregory Provan, University College Cork (UCC), Cork, Ireland.
Tutor: Dr. Menouer Boubekeur, University College Cork (UCC), Cork, Ireland.

M.Sc. in Embedded System Design   **GPA = *8.45/10***
Università dellà Svizzera italiana, Advanced Learning and Research Institute (ALaRI), Lugano, Switzerland. *In collaboration with:* ETH Zurich, Zurich, Switzerland and Politecnico di Milano, Milano, Italy, Sept 2006 - July 2008.
Thesis: *A VHDL Implementation of the Registration Process of the IEEE 802.3ah MPCP Protocol.*
Mentor: Eng. Andrea Tonini, R&D Engineer at EMC SA, Bellinzona, Switzerland.
Tutor: Eng. Davide Finardi, Systems Engineer at SIEMENS, Milan, Italy.

B.Sc. in Electronics and Communication Engineering   **GPA = *82.18%***
Alexandria University, Faculty of Engineering, Department of Electronics and Communications, Alexandria, Egypt, June 2002 - June 2006.
Thesis: *A VHDL Implementation of the CDMA IS-95 Communication System.*
Advisor: Prof. Mohamed Elbana, Alexandria University, Egypt.

PUBLICATION

1. **Alie El-Din Mady**, Andrea Tonini and Davide Finardi, "Design Space Exploration of PISA Architecture For ONU Auto-discovery Process", *Proc. 6th International Conference on Electrical Engineering (ICEENG 2008)*, page 1249-1257, Cairo, Egypt, 27-29 May 2008.

2. **Alie El-Din Mady**, Anirban Dutta Choudhury and G. Serazzi, "Performance Evaluation of Computer Memory Hierarchy", *Performance Evaluation Modeling with JMT: Learning by Examples, Technical Report*, Politecnico Di Milano, page 108-134, Milan, Italy, 27 Jan. 2008.

3. **A. Mady**, M. Boubekeur and G. Provan, "Integrated Simulation Platform for Optimized Building Operations", *Proc. International Conference on Intelligent Building and Management (ICIBM 2009)*, page 626-631, Singapore, 17-19 April 2009.

4. **Alie El-Din Mady**, and Andrea Tonini, "A VHDL Implementation of ONU Auto-discovery Process for EPON", *Proc. International Conference on Networking and Media Convergence (ICNM09)*, page 24-25, Cairo, Egypt, 24-25 March 2009.

5. **A. Mady**, M. Boubekeur and G. Provan, "Compositional Model-Driven Design of Embedded Code for Energy-Efficient Buildings", *Proc. 7th IEEE International Conference on Industrial Informatics (INDIN 2009)*, page 250-255, Cardiff, UK, 24-26 June 2009.

6. M. Behrens, G. Provan, M. Boubekeur and **A. Mady**, "Model-Driven Diagnostics Generation for Industrial Automation", *Proc. 7th IEEE International Conference on Industrial Informatics (INDIN 2009)*, page 708-714, Cardiff, UK, 24-26 June 2009.

7. G. Provan, J. Ploennigs, M. Boubekeur, **A. Mady** and A. Ahmed, "Using BIM Data for Generating and Updating Diagnostic Models", *Proc. The Twelfth International Conference on Civil, Structural and Environmental Engineering Computing*, Funchal, Madeira, Portugal, 1-4 September 2009.

8. **Alie El-Din Mady**, Menouer Boubekeur, Gregory Provan, "Towards Integrated Hybrid Modelling and Simulation Platform for Building Automation Systems; First Models for a Simple HVAC System", *Proc. 9th Information Technology and Telecommunication Conference (9th IT&T)*, page 191-199, Dublin, Ireland, 22-23 October 2009.

9. **Alie El-Din Mady**, Menouer Boubekeur, Gregory Provan, "Optimised Embedded Distributed Controller for Automated Lighting Systems", In CPSWEEK, *First Workshop on Green and Smart Embedded System Technology: Infrastructures, Methods and Tools (GREEMBED 2010)*, Sweden, 12 April 2010.

10. **Alie El-Din Mady**, Menouer Boubekeur, Gregory Provan, Conor Ryan, Kenneth N. Brown, "Intelligent Hybrid Control Model for Lighting Systems Using Constraint-Based Optimisation", *5th International Workshop on Soft Computing Models in Industrial Applications (SOCO 2010)*, Portugal, 16 -18 June, 2010.

11. **Alie El-Din Mady**, Menouer Boubekeur, Gregory Provan, "WSAN QoS Driven Control Model for Building Operations", *5th International Workshop on Soft Computing Models in Industrial Applications (SOCO 2010)*, Portugal, 16 -18 June, 2010.

12. Andrea Tonini, Mohammad Al Hissi, **Alie El-Din Mady**, "EPON CWDM Optical Light Expander with Adaptive Prediction Scheduler", *Proc. 1st International Conferences on Access Networks, Services and Technologies (ACCESS 2010)*, Valencia, Spain, 20 - 25 September, 2010.

PUBLICATION Continued	13 **Alie El-Din Mady**, Menouer Boubekeur, Gregory Provan, "Interactive Refinement of Distributed Control/WSAN Design for Optimal Building Operation Systems", *8th European Conference on Product & Process Modelling (ECPPM 2010)*, Cork, Ireland, 14 -16 September, 2010.

14   C. Ryan, K. N. Brown, **A. Mady**, M. Boubekeur, G. Provan, "A constraint-based intelligent controller for lighting systems", *8th European Conference on Product & Process Modelling (ECPPM 2010)*, Cork, Ireland, 14 -16 September, 2010.

15   **Alie El-Din Mady**, Andrea Tonini, "Ethernet Passive Optical Network (EPON) System: A VHDL Implementation of ONU Auto-discovery Process of the IEEE 802.3ah MPCP Protocol", *book, LAP LAMBERT Academic Publishing*, ISBN-13: 978-3843364966, 3 November, 2010.

16   A. Tonini, **A. Mady**, R. Alimur, "E-PON IPACT VHDL Implementation", *Journal of Telecommunications*, Volume 7, Issue 1, February 2011.

CONFERENCE REVIEWER

1.   International reviewer at Design, Analysis and Tools for Integrated Circuits and Systems-International Conference of Mathematical Sciences (*DATICS-ICMS'09*), Istanbul, Turkey, 4-10 August 2009.

2.   International reviewer at International Journal of Design, Analysis and Tools for Integrated Circuits and Systems, 2009 (*IJDATICS'09*).

3.   International reviewer at The International Conference on Electrical Engineering (*ICEE'10*), Hong Kong, 17-19 March 2010.

4.   International reviewer at International Journal of Design, Analysis and Tools for Integrated Circuits and Systems, 2010 (*IJDATICS'10*).

5.   International reviewer at International Conference on Electronic Devices, Systems & Applications (*ICEDSA 2010*), Kuala Lumpur, Malaysia, 11-13 April 2010.

6.   International reviewer at the 5th International Conference on Future Information Technology (*FutureTech 2010*), Busan, Korea, 21-23 May 2010.

7.   International reviewer at the 3rd International Conference on Information Sciences and Interaction Sciences (*DATICS-ICIS'10*), Chengdu, China, 23-25 June, 2010.

8.   International reviewer at 2010 IEEE Symposium on Industrial Electronics & Applications (*ISIEA 2010*), Penang, Malaysia, 3-6 Oct., 2010.

9.   International reviewer at the 1st IEEE International Conference on Networked Embedded Systems for Enterprise Applications (*DATICS-NESEA 2010*), Suzhou, China, 25-26 Nov., 2010.

10.   International reviewer at the International MultiConference of Engineers and Computer Scientists 2011 (*IMECS 2011*), Hong Kong, 16-18 March, 2011.

11.   International reviewer at the 9th IEEE International Symposium on Parallel and Distributed Processing with Applications (*ISPA 2011*), Busan, Korea, 26-28 May, 2011.

12.   International reviewer at the International Conference on Electronic Devices, Systems & Applications (*ICEDSA 2011*), Kuala Lumpur, Malaysia, 25-27 April, 2011.

13.   International reviewer at 2011 International Conference on Business, Engineering and Industrial Applications (*ICBEIA 2011*), Kuala Lumpur, Malaysia, 5-8 June, 2011.

| THESIS SUPERVISION | 1. | Master's Thesis Co-advisor for Mohammad Al-Hissi, "EPON Scheduler, Predictive Dynamic Bandwidth", Master of Science Thesis, Advanced Learning and Research Institute (ALaRI), Università dellà Svizzera italiana, Lugano, Switzerland, 2009. |

2. Master's Thesis Co-advisor for Ma Ji, "3D Visualization and Simulation for Energy Efficient Automated Lighting Systems", Master of Science Thesis, Computer Science Department, University Collage Cork (UCC), Cork, Ireland, 2009.

HONORS & AWARDS

1. *Full Scholarship* for the academic year 2008-2011 of Ph.D. program under ITOBO (Information and Communication Technology for Sustainable and Optimised Building Operation) project at CCSL, UCC, Cork, Ireland.

2. *Full Scholarship* for the academic year 2007-2008 of M.Sc. program on Embedded System Design at ALaRI, Università dellà Svizzera Italiana, based on Academic year 2006-2007 performance.

3. The Second Best Project at Dependable Systems Workshop, ALaRI, Lugano, Switzerland.

4. Honor Degree in the B. Sc. of Electrical and Communication Engineering.

5. 1st position in the universities youth week, Mansoura, Egypt.

6. 2nd position in the 9th Engineering Competition, Banha, Egypt.

7. 5th position in the project day, Alexandria University, Faculty of Engineering, Electronics and Communications dept., Alexandria, Egypt.

8. 1st position in Egyptian Engineering Day 2006, Cairo, Egypt.

WORK EXPERIENCE

1. *Guest Lecturer* at Mobile Computing workshop, Civil Engineering Department, University Collage Cork, Cork, Ireland.

2. *Teaching Assistant* of Large-scale Applications Development and Integration course at University Collage Cork, Cork, Ireland, 2009/2010 & 2010/2011.

3. *Teaching Assistant* of VHDL course at ALaRI, Università dellà Svizzera Italiana, Lugano, Switzerland, Oct 2007 - Nov 2007.

4. R&D Engineer at Info&Soft for Embedded Systems, Alexandria, Egypt, May 2006 - Sep 2006.

5. *Instructor* of PIC microcontroller at Info&soft for Embedded System, Alexandria, Egypt, July 2005 - Sep 2005.

6. *Instructor* of PIC microcontroller at Alexandria University, Faculty of Engineering, Alexandria, Egypt, July 2005 - Sep 2005.

7. *Instructor* of VHDL at Alexandria University, Faculty of Engineering, Electronics and Communications dept, Alexandria, Egypt, Sep 2006.

TECHNICAL
SKILLS

1. **HDL Design:**

   - ***Hardware Tools:*** FPGA (Xilinx, Altera), CPLD.
   - ***Embedded Microcontroller:*** PicoBlaze.
   - ***Languages:*** VHDL, Verilog, SystemC.
   - ***Software Tools:*** Xilinx ISE, Modelsim, Quartus, Synopsys Design Compiler & Power Compiler, FPGA Advantage, Leonardo Spectrum.

2. **Embedded Processor and ASIP Design:** LisaTek Processor Designer.

3. **Microcontroller:**

   - ***Controllers:*** PIC12Fxx/16Fxx/18Fxx, AVR AT90Sxx, ATmega.
   - ***Software Tools:***
     (a) *Embedded basic:* PIC basic, Bascom, mikro basic.
     (b) *Embedded C:* CCS, PSoC Designer.
     (c) *Assembly language:* MPLAB IDE, AVR studio.

4. **Mixed Signal Arrays:** Cypress PSoCs using PSoC Designer and PSoC Express.

5. **Interfacing:** Parallel port, serial RS232C, serial RS485, TCP/IP, game port, A/D, LCD, seven segment, PS/2, television, GPS receiver module, card reader, Infrared, ISD (sound recorder IC), DC motor, stepper motor, AC motor, digital relay.

6. **PCB:** Eagle.

7. **RTOS:** VxWorks.

8. **Programming Language:** C/C++, Java, MATLAB, Visual basic, Bash scripting, JavaCC, Lex, Yacc.

9. **Modelling Language:** CHARON, Bond Graph, UML, SysML.

10. **Wireless Sensor/Actuator Network:** Sun-SPOT mote, CYLON wireless network.

11. Embedded Java using *J2ME*.

12. Analog Design using advanced design system (ADS) and Pspice simulation tools.

13. Programming under windows and Linux, Microsoft office, LaTeX.

PROJECTS   **HDL Designs:**

A VHDL Design and Implementation of Game of Life on FPGA
`ALaRI/EPFL, Switzerland`
The John Conway's Game of Life cellular automaton has implemented of Xilinx Spartan 3 FPGA XC3S400 with VGA interface and keyboard interface. A resolution of 128 by 128 was reached at a frequency 60 generation per second; the game can be run in continuous mode or step mode, and the initial pattern can be initialized using the keyboard.

A VHDL design and implementation of GCD algorithm
`ALaRI/EPFL, Switzerland`
The goal of the project is to design a hardware model to calculate the Greatest Common Divisor (GCD), the design was in various abstraction levels mainly behavioral and RTL design with different hardware constraints, then using the Synopsys Power Compiler optimization techniques on the various designs to have a performance (Latency, Area and Power) for all design points.

Macro-modeling of Multipliers
`ALaRI, Switzerland & Politecnico di Torino, Italy`
In this project, power macro-modeling of different combinational multipliers has been studied. The VHDL description of the multipliers is written at RTL. The different multipliers considered are conventional serial shift-add, booth, wallace tree and parallel shift-add. Linear equation and look-up table models have been applied during characterization phase and then the models have been tested with different test inputs.

Design of an efficient JPEG encoder using SystemC
`ALaRI, Switzerland & FMTC/IMEC, Belgium`
In this project an efficient JPEG encoder was designed and implemented using SystemC. The RTL model for the DCT operation of the JPEG encoder was efficiently implemented using a fast DCT approach. The throughput of the designed JPEG encoder was verified with the SystemC simulator for the real time behavior.

Embedded Processor Design with Custom Instruction Implementation using LISA 2.0 and micro-Profiler
`ALaRI, Switzerland & Aachen, Germany`
The functional hot-spots of the computationally intensive Blowfish encryption algorithm were pointed out using microProfiler. Few special instructions were designed using the LISA HDL in order to speed up the application.

Microcontroller Applications:

Telecommunication and Monitoring System for Deaf and Mute
`Alexandria University, Egypt`
A chatting protocol for the deaf and mute people was created using a telephone line and a television interfaces, so the deaf and mute individual would use the telephone key pad as a key board (as the case in the mobile phone) and what he is writing is displayed at the other side on the television screen. This system is based on PIC16F628 Microchip microcontroller. The PCB board was designed and assembled.

Security System using PIR Detection
`Alexandria University, Egypt`
Presence of a human body is detected by using PIR (Personal InfraRed) sensor and sending a signal to a microcontroller to fire an alarm. This system is based on PIC16F84 Microchip microcontroller. The PCB board was designed and assembled.

PROJECTS
Continued

PLC Module for Milling Machine
`Alexandria University, Egypt`
A control system was built to manage all the processes in an actual milling machine, such as the crashing time, amount of crashing material. This PLC model is based on PIC16F877 Microchip microcontroller. The PCB board was designed and assembled.

Vending Machine Access Control System
`Infor&Soft, Egypt`
This project was a product for Info&Soft Company in Egypt, the products in the vending machine can be accessed using memory card and key pad. If a certain product is finished the machine sends SMS massage to the control unit with the states of each product. This system is based on microcontroller Info&Soft prototype kits.

Architecture Optimization:

Iteration-constrained Optimization of PISA Architecture for MPEG Decoder Benchmark Design Space Exploration
`ALaRI, Switzerland & Politecnico di Milano, Italy`
In this project, we worked on the MPEG Decoder Benchmark code using Simplescalar and Wattch tools. The size of the design space was constrained by a given simulation time. The MPEG code was studied to point out different resource requirements and their effect on both cost and performance. Different Processor parameters (e.g. The functional blocks like ADDER, MUL, MAC etc.; cache parameters like associativity, line size, cache replacement policy etc.) were varied to plot the cost-performance Pareto curve.

A Fast and Efficient Simulated Annealing based Design Space Exploration for a Custom VLIW Architecture for imgpipe Benchmark and Optimizations using VEX compiler
`ALaRI, Switzerland & HP Research Lab, Barcelona`
This project described an attempt to find out the best custom VLIW architecture for an Imgpipe Application. Various code level optimization steps are taken to enable the application to utilize the architecture in an efficient way.

Software Applications:

Digital Mobile Receiver Design: Synchronization and Detection using MATLAB
`ALaRI, Switzerland & Aachen, Germany`
A step-by-step approach was taken to develop a digital mobile receiver using MATLAB. The steps included: Mapping and Damping of noisy signals, Frame Synchronization, Pulse Shaping and Matched Filtering, Timing Synchronization and finally Phase Synchronization of the noisy QPSK modulated signal. Different statistics like change of BER over SNR, Eye diagram were reported.

A MATLAB Implementation of Time Scaling / Pitch Shifting of Speech and Audio
`ALaRI, Switzerland & K.U.Leuven, Belgium`
The goal of the project was to implement time scaling and pitch shifting of speech and audio to modify the speed or the pitch of a given sound; OLA, SOLA and PSOLA algorithms have been implemented using MATLAB.

Web Browser Development for Mobile phones using J2ME
`ALaRI, Switzerland & Universita degli Studi di Parma, Italy`
A fully featured web browser for mobile phones was developed using Java 2 Platform, Micro Edition. The features included history, bookmark options(e.g. save and open bookmarks) and buffer overflow detection (for opening pages with large data accumulation like amazon.com).

PROJECTS
Continued

VHDL2C Compiler
`ALaRI, Switzerland & Politecnico di Milano, Italy`
VHDL to C compiler was built using Lex & Yacc software compiler tools to parse each command in VHDL and convert it to the corresponding command in C code.

Researches:

Scalable Processor Architecture Research
`ALaRI, Switzerland & Universitat Politecnica de Catalunya, Spain`
This research compared the architecture differences of UltraSPARC II, UltraSPARC I, Ultra-SPARC III, UltraSPARC IIIi, UltraSPARC-III, UltraSPARC-IV and UltraSPARC T1.

Indexing Techniques in Real-Time Database
`ALaRI, Switzerland & Politecnico di Milano, Italy`
This research studied the techniques which have been used in the real-time database to decrease consuming power, searching time and complexity and increase the predictability.

INTERNSHIPS

- Work placement at CYLON Controls Ltd, Dublin, Ireland, Oct. 2009 - Nov. 2009.

- Internship at R&D department of EMC SA, Bellinzona, Switzerland, Feb 2008 - March 2008.

- Summer training at Egyptian company for power transmission, Alexandria, Egypt.

- Summer training at R&D department in Info&Soft for embedded system, Alexandria, Egypt.

PERSONAL INFORMATION

Date of Birth:	09 April, 1984.
Nationality:	Egyptian.
Mobile Number:	(+353) (0) 858337775.
Email Address:	mae1@cs.ucc.ie, alieeldin.mady@gmail.com.
Web site:	www.alieeldin.synthasite.com.
skype ID:	alie_eldin.
Language Proficiency:	English (Fluent), Arabic (Native).

References

Prof. Gregory Provan
Professor, Department of Computer Science
University College Cork (UCC), Cork, Ireland
Email: *g.provan@cs.ucc.ie*

Dr. Menouer Boubekeur
Postdoctoral, Department of Computer Science
University College Cork (UCC), Cork, Ireland
Email: *m.boubekeur@cs.ucc.ie*

Prof. Mariagiovanna Sami
Professor, Dipartimento di Elettronica e Informazione
Politecnico di Milano, 20133 Milano, Italy
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Dr. Umberto Bondi
Program Manager, University of Lugano, ALaRI
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Eng. Andrea Tonini
R&D Engineer at EMC SA, Bellinzona, Switzerland
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Eng. Davide Finardi
Systems Engineer at SIEMENS, Milan, Italy
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Prof. Mohamed Elbana
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