

SUMMARY

- I am assistant professor in Biomedical engineering. I got my PhD from Cairo University. My work was in how to extract biological knowledge from available databases using statistical methods. Also I am standard reviewer of high impact bioinformatics journals like Oxford Bioinformatics and BMC Bioinformatics.

RESEARCH INTERESTS

Bioinformatics, Cancer Biology, Gene Regulatory Network, Biological Network, Molecular Biology, Biotechnology, Nanotechnology, Glucose Insulin Feedback System, System Dynamics, Biomedical Signal Processing.

BIOINFORMATICS PROJECTS

- Current Projects:
 - Dengue Virus: Study Dengue Virus Transmission in Yemen Using Gene Regulatory Network.
 - NCBBN: A Cytoscape plug-in to infer the Gene Regulatory Network from Gene Expression Profiles.
 - GFP: Gene Function Prediction from Biclustering and Gene Ontology Databases.
- Previous Projects:
 - AGO, 2008: Automatic Gene Ontology Software Tool for Bicluster and Cluster Comparisons.
 - CAD, 2009: Computer aided diagnosis of digital mammography images using unsupervised clustering and biclustering techniques.
 - BicAT-Plus, 2010: An Automatic Comparative Biclustering Tool.
 - SSBBN: Gene Regulatory Network Construction using Spectral Subtraction Denoising, Biclustering and Bayesian Network.
 - SSA, 2010: Micorarray Denoising Algorithm using Spectral Subtraction.
 - BCTool, 2011: Biclustering comparison toolbox.
- Grant Proposal:
 - BIODEFENSE: Bioinformatics Applications for Pathogen Detection and Virulence Elements Comprehension (PDVEC), June 30, 2009, Information Technology Industry Development Agency (ITIDA) AND Information Technology/Academia Collaboration Program (ITAC),Egypt.
 - Integration of Bioinformatics, Omics and Data Mining for Hepatocellular Carcinoma:Phase I: Biomarker discovery for early Detection, prognosis and virus -host Interactions inference, July 15, 2009, Information Technology Industry Development Agency (ITIDA) AND Information Technology/Academia Collaboration Program (ITAC),Egypt.
 - Signature and Virulence Discovery pipeline, October 19, 2009, U.S. - Egypt Joint Board on SCIENTIFIC AND TECHNOLOGICAL COOPERATION, USA.

DIABETES PROJECTS

- ETMS, 2005: An Educational Tool for Learning First Year Medical students Diabetes Dynamics.
- UMUO, 2006: Understand the Mechanism Underlying Ultradian Oscillations in Diabetes Patients.

EDUCATION

Cairo University, Cairo, Egypt

Ph.D., October 2009 Systems and Biomedical Engineering

- Thesis field: Bioinformatics
- Thesis Topic: *Construction of the Gene Regulatory Network Using Bayesian Network and Biclustering*
- Adviser: Professor Yasser M. Kadah
- Area of Study: Bioinformatics

M.S., Systems and Biomedical Engineering, April 2006

- Thesis field: Diabetes Modeling
- Thesis Topic: *The Metabolic Endocrine Glucose-Insulin Regulatory System: System Dynamics Approach*
- Adviser: Professor Abdallah Said Ahmed
- Area of Study: Control Engineering

B.S., Systems and Biomedical Engineering, July 2003

- High Good (74%)
- Undergraduate project Grade: Distinction
Infusion Pump: The aim of this project is to control the flow of medical fluids to the patient.
Hardware and software Implementation using:
 - * C, VB.
 - * Matlab.
 - * Orcad capture and layout.
 - * Keil S/W.

AWARDS

U.S. National Academies and Kuwait Institute for Scientific Research (KISR)

- Selected as the best young scientists, engineers, and medical professionals from the United States and the countries of the Arab League to attend the 1st Arab-American Frontiers of Science, Engineering, and Medicine symposium from 17-19 October 2011, Kuwait, Kuwait.

TWAS-ARO Travel Grant

- Selected as a young promising scientists from developing countries to attend Biobitocs workshop from 13-14 December 2010, Alexandria, Egypt.

TWAS/BVA.NXT 2010 Travel Grant

- Selected as a young promising scientists from developing countries to participate in TWAS/BioVision Alexandria.NXT 2010 and BioVision Alexandria Conference from 10-15 April 2010, Alexandria, Egypt.

Yemeni Ministry of Higher Education and Scientific Research

- Graduate Research(PhD) Fellowship, 2006
- Graduate Research(Master) Fellowship, 2003
- Undergraduate Scholarship, 1998

Cairo University

- Cairo University award for graduation students 2006

PUBLICATIONS

- F. M. Al-Akwaa** and Y. M. Kadah, *Construction of Gene Regulatory Networks using biclustering and Bayesian networks*, Theoretical Biology and Medical Modelling, 8:39, 2011. [ISI link](#)
- F. M. Al-Akwaa**, Analysis and Visualization of Gene Expression Data Using Biclustering: A Comparative Study, African Journal of Biotechnology, Vol. 11 (7), pp. 1744-1753, 24 January, 2012. [ISI link](#)
- F. M. Al-Akwaa**, A New Software to Construct Gene Regulatory Networks From Microarrays Data, ISESCO Science & Technology Vision Journal, vol. 1, no. 1, pp.24-31, 2010.
- F. M. Al-Akwaa**, K. Wahba, and A. S. Ahmed, Modeling and Analysis of Glucose-Insulin Oscillatory System, Bioinformatics and Medical Engineering, vol. 8, no. 1, pp.25-30, 2008.
- F. M. Al-Akwaa**, H. H. Mazzar and M. M. Alkhwadni, BCTool: a biclustering comparison toolbox, Bioinformatics, 2011. **Submitted**
- F. M. Al-Akwaa** and M. H. Ali, BicAT-Plus: software tool for comparing biclustering algorithms, BMC Bioinformatics, 2011. **Submitted**

BOOK

- F. M. Al-Akwaa**, *The Dynamic of Glucose-Insulin Endocrine Metabolic Regulatory System: A System Dynamics Approach*, VDM Verlag, 2008.
- F. M. Al-Akwaa**, *Gene Regulatory Networks Construction*, LAP LAMBERT Academic Publishing, 2010.

- F. M. Al-Akwaa**, and Y. M. Kadah, “A Novel Micorarray Denoising Algorithm using Spectral Subtraction,” in 1st Middle East Conference on Biomedical Engineering, Sharjah, UAE, 2011. [Link](#)
- F. M. Al-Akwaa**, N. H. Solouma, and Y. M. Kadah, “A New Software to Construct Gene Regulatory Networks From Microarrays Data,” in 27th National Radio Science Conference (NRSC) Menofieh University, Cairo, Egypt, 2010.
- F. M. Al-Akwaa**, N. H. Solouma, and Y. M. Kadah, “Performance Comparison of the Structure Learning Bayesian Network Algorithms Using Gene Expression Data,” in 27th National Radio Science Conference (NRSC) Menofieh University, Cairo, Egypt, 2010.
- M. A. Al-Olfe, **F. M. Al-Akwa**, W. A. Mohamed, and Y. M. Kadah, “Computer Aided Diagnosis of Digital Mammography Images Using Unsupervised Clustering and Biclustering Techniques,” in SPIE San Diego, California, USA, 2010. [Pdf](#)
- F. M. Al-Akwaa**, N. H. Solouma, and Y. M. Kadah, “SSBBN: Gene Regulatory Network Construction using Spectral Subtraction Denoising, Biclustering and Bayesian Network,” in The 6th Annual RECOMB Satellite on Regulatory Genomics, the 5th Annual RECOMB Satellite on Systems Biology, and the 4th Annual DREAM reverse engineering challenges., MIT, 2009. [poster](#) [Abstract](#) [Link](#)
- F. M. Al-Akwaa**, M. H. Ali, and Y. M. Kadah, “BicAT-Plus: An Automatic Comparative Tool For Bi/Clustering of Gene Expression Data Obtained Using Microarrays,” in 26th National Radio Science Conference (NRSC) Future university, Cairo, Egypt, 2009. [Link](#)
- F. M. Al-Akwaa** and Y. M. Kadah, “Automatic Gene Ontology Software Tool for Bicluster and Cluster Comparisons,” in IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology TN, USA, 2009. [Link](#)
- F. M. Al-Akwaa**, K. Wahba, and A. S. A. Mohamed, “Modelling the Glucose Regulatory Feedback System: Understand the Mechanism Underlying Ultradian Oscillations,” in 24th International Conference of the System Dynamics Society, Nijmegen, Netherlands, 2006. [Link](#)
- F. M. Al-Akwaa**, K. Wahba, and A. S. A. Mohamed, “The Dynamics of Glucose Regulatory System: An Educational Tool for the Students of First Medical Year,” in The 23rd International Conference of the System Dynamics Society, Boston, USA, 2005. [Link](#)

- Program Committee of the BICOMP11, the International Conference on Bioinformatics and Computational Biology, July 18-21, 2011, Las Vegas, USA.
- Associate Editor of the International Journal of System Dynamics Applications (IJSDA).
- Reviewer of the Bioinformatics Oxford Journal.
- Editorial Board Member of the Journal of Computational Biology and Bioinformatics Research (JCBBR).
- Reviewer of the International Journal of Bioinformatics Research and Applications
- Peer Reviewer of the IEEE International Conference on Computer Science and Information Technology, June 10-12, 2011, Chengdu, China.
- 29rd International Conference of the System Dynamics Society, July 24 – 28, 2011, Washington, DC, USA. Theme: System Dynamics in Educational.
- 28rd International Conference of the System Dynamics Society, July 25 – 29, 2010, Seoul, Korea. Theme: modeling complex system.

- 27rd International Conference of the System Dynamics Society, 26-30 July, 2009, Albuquerque, NM, USA. Theme: system dynamics military application.
- 26rd International Conference of the System Dynamics Society, 20-24 July, 2008, Athens, Greece. Theme: modeling complex system.
- 25rd International Conference of the System Dynamics Society, 30-2 August, 2007, Boston, USA. Theme: modeling complex system.
- 24rd International Conference of the System Dynamics Society, 24-27 July, 2006, Nijmegen, the Netherlands. Theme: using system methodology in health development.

TECHNICAL SKILLS

- BIOINFORMATICS SOFTWARE:
 - Biolearn, Dana Pe'er, Columbia University.
 - BANJO, Alexander J. Hartemink, Duke University.
 - Cytoscape and its plugins.
 - BNT, Kevin P Murphy, University of British Columbia.
 - Bingo, Steven Maere, Ghent University.
 - NetworkAnalyzer, Max Planck Institute for Informatics.
 - MCODE, The University of Toronto.
 - BicAT Simon Barkow, ETH Zurich.
 - Expander, Ron Shamir, Tel Aviv University.
- MATLAB experience: Bioinformatics, control system, filter design, genetic algorithm and direct search, digital signal processing, system identification, linear algebra, Fourier transforms, nonlinear numerical methods, polynomials, statistics, visualization
- Programming: C, C++, Pascal, Perl, SQL, Java, python, VB, and others
- Instrumentation and Control: Simulink, LabVIEW and other National Instruments control and data acquisition hardware and software
- Hardware: Hardware/Firmware development projects, Biomedical Equipment, Bioelectronics, Control, Measurements, Robotics and Development kits.
- Modelling: Model Non-linear complex system using system dynamics packages itthink, Stella, Vensim.
- Design Circuit: Electronics programs Like EWB.
- Extensive hardware and software experience in ,designing, modeling and machine learning
- Applications: T_EX, L^AT_EX, BIBT_EX, Microsoft Office, and other common productivity packages for Windows platform.
- Operating Systems: Microsoft Windows XP/2000, Linux, Solaris, and other UNIX variants
- Hardware Interface: Parallel Port, Serial Port, USB, Assembly Language and Embedded Systems Programming using Keil sw.

TRAINING AND
SEMINARS
ATTENDED

- **2010 Fluke Biomedical Engineering Calibration Laboratory**, Al-Reem Hospico Company L.L.C., Haris Al Afaq, and Tawam Hospital, 18-31 October, Al-Aian, UAE.
- **2009 Biotechnology and Bioinformatics workshop**, Fayuom University, Egypt.
- **2005** Three-day workshop in MRI/CT instrumentation, **CASBEC**, Egypt.
- **2005** One month course in System Dynamics methodology, **RITI**, Cairo, Egypt.
- **2004** One month course in java programming language, **CASBEC**, Egypt
- **2004** Biomedical Engineering Consultation (**CASBEC**), Egypt. Two-weeks course in hospital management, **CASBEC**, Egypt.
- **2003** One month training, Siemens Medical Limited , Cairo, Egypt
- **2000** One month course in Microelectronic, **CASBEC**.
- **2001** One month training, El Kasr el Aini (French Hospital), Cairo, Egypt.

SEMINARS,
CONFERENCE AND
MEETING
ATTENDED

- **February 21-25, 2011 The First Middle East Biomedical Engineering Conference**, American University of Sharjah, Sharjah, United Arab of Emirate.
- **December 12-15, 2010 Birobitocs Workshop**, BA, Alexandria, Egypt.
- **April 10-15, 2010 TWAS/BioVision Alexandria.NXT2010 and BioVision-Alexandria Conference**, BA, Alexandria, Egypt.
- **March 17-19, 2009 26th National Radio Science Conference Cairo**, Future University, Egypt.
- **February 13-16, 2009 First Alexandria international Congress on Tissue Engineering**, Alexandria, Egypt.
- **January 4-6, 2009 First Annual conference on nanotechnology, biotechnology, plant biotechnology, and bioinformatics**, Cairo, Egypt.
- **December 18-20, 2008 Fourth Annual International Conference on Biomedical Engineering**, Cairo, Egypt.
- **September 21-24, 2006 Fourth Annual International Conference on Biomedical Engineering**, Cairo, Egypt.
- **December 24-25, 2002 First Annual Conference on Biomedical Engineering**, Cairo, Egypt

MEMBERS IN THE
FOLLOWING
ASSOCIATIONS

- **2009-present** Member of IEEE
- **2009-present** Member of IEEE/Computational Intelligence Society
- **2003-present** Member of International Systems Dynamics Society.
- **2005-present** Member of the Egyptian Diabetic Society.

PROFESSIONAL
EXPERIENCE

- 2010-Present Fluke Calibration Laboratory Manger, University of the Science & Technology, Yemen.
- 2003-Present Maintenance Engineer, Ministry of Youth and Sports, Sports Health Center, Yemen.
- 2003-2006 Research Assistant, RITI, Cairo, Egypt. Task included research in the field of business dynamics using system dynamics methodology.
- 2003-present Consultant Biomedical Instruments Advisor, The Yemeni High Tender Committee, Ministry of Financial, Yemen.
- 2003-present Consultant Biomedical Instruments Advisor, Social Development Funds, Yemen.
- 2003-2005 Maintenance Engineer, Ministry of Agriculture and Irrigation, General Department for Plant Protection, Yemen.
- 2004-2005 Maintenance Engineer, Cairo University, Center for Advanced Software and Biomedical Consultation (**CASBEC**), Faculty of Engineering, Egypt.

ACADEMIC
EXPERIENCE

University of Science and Technology, Sana'a, Yemen

Assistant Professor

November 2009 to present

- Supervisor of more than 10 undergraduate projects supported by EWH and NI as:
 - Leakage Current Tester
 - Pulse Ox Phantom
 - Biorobitoics
 - Spectrophotometer
 - Infusion Pump
 - Pulse Oximeter for Heart Rate
 - Computerized Maintenance Management System
 - Defibrilator Tester
 - Universal Surgery Light Bulb Replacement
- The progress of these projects be found in [Google Spreadsheet](#)
- Instructor for Medical Equipments I & II(4th Year students)
 - Advisor of more than 20 projects ranging from DNA sequencing To MRI [Google Spreadsheet](#)
- Instructor for Probability and statistics for BME (3th Year students)
- Instructor for Medical Laboratory Instruments (3th Year students)

Assistance Teacher

June 2006 to November 2007

- Instructor for Electronics System (4th Year students)
- Instructor for Introduction to Biomedical Engineering (1th Year students)
- Instructor for Electrical Engineering II (1th Year students)
- Instructor for Fundamental of Computers (1th Year students)

Biomedical Engineering Program Founder

June 2006 to November 2007

Duties include:

- Performed the complete feasibility analysis about introducing the BME program at the UST.
- Prepared all the Paper catalogues, Videos and computer demonstrations about the BME program.
- Supervised the BME program curriculum and syllables committee.
- Designed the specifications of the Biomedical Engineering Laboratories.
- Provided the lasts resources on Biomedical Engineering which contains more than 50 Books and 110 CD's.
- Managed and direct the Biomedical Engineering Program at the UST.
- Academic advisor of the BME program students.
- Coordinated the training program of the BME program students.

Cairo University, Giza, Egypt

PhD Researcher

September 2006 to November 2009

- Construct *Yeast* gene regulatory network from microarrays database.
- Classify breast cancer images using biclustering approach.
- One of the research team of the Biodefense project submitted (2009) to the **ITIDA**, Giza, Egypt.
- One of the research team of the liver cancer project submitted(2009) to the **STDF (US-Egypt Grant)**, Giza, Egypt.
- Guide the **ITI** undergraduate students in selection their graduate projects.

MSc Researcher

September 2003 to June 2006

- Study the dynamics of the glucose-insulin oscillatory system.
- Teach the system dynamics software like **VENSIM** and **STELLA** at **RITI**, Cairo, Egypt.
- Active member in the **system dynamics mailing list**
- Guide 4th year biomedical engineer to select appropriate **National Instruments** kit for their projects.

Undergraduate Student

September 1998 to July 2003

- Complete the following projects
 - 2001 Educational game using C language.
 - 2001 A digital clock design & hardware implementation.
 - 2002 Data base for a Mother Company using VB, Access.
 - 2002 Analog and digital processing of simulated data of EEG, ECG and EMG signals.
 - 2002 Graphics project using VB.
 - 2003 Embedded system implementations in many hardware projects such that (flasher, Elevator system, IC tester, function Generator and simulation of the Bio signals, data acquisition system, Frequency and Amplitude Detection System Microcontroller-PC handshaking using Serial Communication, digital filter.) using Assembly language in s/w.
 - 2003 Microcontroller programmer (H/W implementation).
 - 2003 Artificial Intelligence Techniques implementation in a Master Mind game & using serial communication.
- Complete the following courses:
 - Biomedical Imaging Devices (Ultrasound, X-Ray, CT, MRI, SPECT, PET, Dental X-Ray, Panorama, Nuclear Medicine, CCD Camera and Sensors).
 - Continuous- and Discrete-Time Control Systems (Classical and Modern).
 - Electronic Systems (Microprocessor and Microcontroller) with projects:
 - EEPROM Programmer.
 - Digital Filter (Software using Visual C#).
 - Digital Filter (Hardware using Microcontroller).
 - Elevator System.
 - Frequency and Amplitude Detection System.
 - Function Generator plus ECG simulator.
 - Microcontroller-PC handshaking using Serial Communication.
 - Bioelectronics with projects:
 - Multi-Patient Temperature Monitor with built-in Camera as a patient observation system.
 - Wireless Voice Communication using Infrared.
 - Computer Courses (Artificial Intelligence, Networking, Database, Data Structure, Graphics, Cryptology and security) with projects:
 - Psychological Game (using C).
 - TFTGraphica (Autocad-like program using VBasic).
 - Master Mind Game.
 - Biomedical Consultation and Maintenance Database System.
 - Digital Image Processing.
 - Advanced Topics in Biomedical Engineering, including Biomechanics, interaction of extremely low frequencies, CCD Camera, Fluorescence Microscopes and Potentiometric Dyes.
 - Artificial Heart (Design, Control and Problems).
 - Clinical Engineering.
 - Electromagnetic field and waves.
 - Biostatistics and Stochastic Processes.
 - Bioanalysis Equipment.

- Biomedical modeling.
- Electric Machinery Fundamentals.
- Physiology, Anatomy, Biochemistry and others.

The High Institute of Health Science, Ministry of Health and Population,
Sana'a, Yemen

Assistant Teacher

September 2006 to September 2007

- Instructor for Microprocessor and Assembly Language
- Instructor for Biomedical Electronics
- Consultant for extending the Institute Biomedical Engineering section.

Regional IT Institute, Cairo, Egypt

Assistant Teacher

September 2003 to June 2004

- Trainer MBA students on System dynamics packages like STELLA and VENSIM.

REFERENCES

- **Prof. Yasser M Kadah**, Professor, Systems and Biomedical Engineering Department, Faculty of Engineering, Cairo University, Egypt, Email:ymk@k-space.org.
- **Prof. Abdalla S.A**, Professor, Systems and Biomedical Dept, Faculty of Engineering, Cairo University, Tel: +2 025703426, Email:profabdo@gmail.com.
- **Emad Rasmy**, Professor, Systems and Biomedical Engineering Department, Faculty of Engineering, Cairo University, Egypt, Email:erasmy@gmail.com.
- **Mohamed Eladway**, Professor, Electronic Department, Faculty of Engineering, Helwan University, Egypt, Email:mohamed@eladawy.com.
- **Prof. Nahed H Solouma**, Associate Professor, NILES, Cairo University, Egypt, Email:nsolouma@k-space.org.
- **Dr. Khaled Wahba**, Assistant Professor, Systems and Biomedical Engineering Department, Faculty of Engineering, Cairo University, Egypt, Email:k.wahba@riti.com. Academic Advisor, Regional IT Institute, Cairo, Egypt, Tel: +2 02 737 6006, Fax: +2 02 739 1380.

HOBBIES

- Reading ,Chess and Football

CONTACT INFORMATION

Department of Electronic - Biomedical Engineering Program
University of Science and Technology
Elhouria Str - Al-Tahreier Square
In front of Dream Hotel
Sana'a Yemen
WWW:
<http://fadhl-alakwa.weebly.com/>

Cell1: (00967) 733226746
Cell2: (00967) 777012076
E-mail: fadlwork@gmail.com

CITIZENSHIP

Yemen