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PROFILE

Mohammad is the director of Innovation and Technology at Mahd Sports Academy. He aims to innovate and create different tools, processes, methodologies, or technologies that have a local and global impact on talent identification and development. Before joining Mahd, he was the deputy director of KACST Academy and the founder and chairman of the Saudi Rowing Federation. Mohammad worked with the Engineering Design Center, University of Cambridge, to develop a tangible programming language that supports children in learning programming concepts. He received a certificate of postgraduate studies in computer science from the University of Cambridge, where he investigated the sensations involved in interacting with tangible programming languages. Before his studies at Cambridge, Mohammad was a graduate student research assistant in the City Science (Changing Places) group at the MIT Media Lab and received an M.Sc degree in Media Arts and Sciences. He was a research associate in the Center for Complex Engineering Systems (CCES) at KACST and MIT and a teaching fellow at Harvard School of Engineering and Applied Sciences.

Mohammad received his B.Sc. degree in computer engineering from King Fahd University of Petroleum and Minerals (KFUPM) and an M.Sc. degree in Information from the University of Michigan (UM) - Ann Arbor, where he specialized in Human-Computer Interaction and Incentive-Centered Design. Mohammad's interests have gravitated toward computer interfaces, group collaboration, interactive visualization, and decision-making. He started the CityGame project at the Media Lab. He designed and developed different visualizations and graphical and tangible computer interfaces to evaluate their impact on a city planning negotiation scenario. Before his work on CityGame, Mohammad worked on the Sustainable Infrastructure Planning System (SIPS) project at CCES. He developed a Collaborative Planning Interface (CoPI) to visualize complex data to support decision-makers in making better-informed decisions.

Mohammad continues to design, develop and evaluate interactive visualization tools that support negotiation and collaborative decision-making for complex systems. This work is part of a broader research plan to define an ontology that abstracts, represents, and creates tools and interactive visualizations for data from complex systems.

SUMMARY OF QUALIFICATIONS

- Chairman and Founder of Saudi Rowing Federation
- Mahd Sports Academy Innovation and Technology Director
- Mahd Sports Academy Strategy and Innovation Consultant
- Deputy Director at KACST Academy
- Graduate Student Supervisor, University of Cambridge.
- Graduate Research Assistant in the City Science (Changing Places) Group, MIT Media Lab
- Teaching Fellow at Harvard SEAS.
- Research Associate at CCES.
- Received a Certificate of Postgraduate Studies in Computer Science, University of Cambridge.
- Received an M.S in Media Arts and Sciences, M.S in Information (specialized in HCI and ICD), and B.S in Computer Engineering.
- Experience in software/web development, tangible programming, interface design, social research, object recognition, image processing, and visualization projects.
- Worked in education, Healthcare, computer networks, IT, consulting and advertising domains.
- Published work on programming languages, complex systems visualizations and collaborative planning interfaces in peer reviewed conferences and journals internationally.
- Engaged in group projects and individual projects during my career and school projects.
- Volunteered in conferences and led students and professional organizations.
- Received several awards for academic and professional work.
- Interested in big data interactive visualization, tangible interfaces and collaborative digital workspaces research and decision-making.

EDUCATION

- 2018 **CPGS in Computer Science**
University of Cambridge, Cambridge, UK
- Report: *Sensation in Tangible Programming Languages: A Phenomenological Approach*
 - Report: *Tangible Lambda: Abstract Tangible Programming Function to Support End-user Programming of IoT Devices at Home.*
 - Graphics and Interaction Group (“Rainbow”), Computer Lab
 - Scholarship from King Abdulaziz City for Science and Technology in Saudi Arabia
- 2016 **M.Sc. in Media, Arts and Sciences**
Massachusetts Institute of Technology (MIT), Cambridge, USA
- Thesis: The Impact of Computer Interfaces on Multi-Objective Negotiation Problem.
 - City Science (Changing Places) Group, Media Lab
 - Scholarship from King Abdulaziz City for Science and Technology in Saudi Arabia
- 2009 **M.Sc. in Information, 2009**
University of Michigan (UM), Ann Arbor, USA
- Human-Computer-Interaction (HCI).
 - Incentive-Centered Design (ICD).
 - Ross Business School, Dual-MBA Track, 1 term.
 - Scholarship from the Ministry of Higher Education in Saudi Arabia
- 2006 **B.Sc. in Computer Engineering, 2006**
King Fahd University of Petroleum and Minerals (KFUPM), Dhahran, Saudi Arabia
- University honored student
 - College of Computer Science and Engineering Dean’s List

EXPERIENCE

Innovation and Technology Director 1 year

- Developed department strategy and direction
- Connected with national and international organizations for collaboration and partnership
- Developed Mahd Open Innovation Program and Mahd Talks (distinguished speakers series)
- Developed primary and secondary research programs for sports talent ID and development

Jun 2021 - curenntly Mahd Sports Academy, Innovation and Technology
Riyadh, Saudi Arabia

Research Associate 10 years

- Lead research projects.
- Formulated research questions and methodology.
- Developed frameworks, visualization tools and, Decision Support Systems (DSS).
- Published in top-tier conferences.

Oct 2011 - curenntly KACST and MIT, Center for Complex Engineering Systems (CCES)
Riyadh, Saudi Arabia - Cambridge, MA, USA

Summer 2016 Nokia Bell Labs, Data Science Intern
Cambridge, Cambridgeshire, United Kingdom

Teaching Fellow 4 years

- Assist in teaching courses.
- Lead lab sessions and group sessions.
- Supervised students learning and projects.
- Evaluated assignments and course projects.

Spring 2015, 2016 Harvard University, School of Engineering and Applied Sciences, Visualization Course (CS171)
Cambridge, MA, USA

Oct 2016 - Jan 2018	<p><u>University of Cambridge</u>, Graphics and Interaction Group (“Rainbow”), Computer Laboratory, HCI and Interaction Design courses Cambridge, Cambridgeshire, United Kingdom</p> <p>Research Assistant 5 years Conducted Qualitative and Quantitative Research. Evaluated and analyzed Research Data.</p>
Sep 2013 - Jun 2016	<p><u>MIT Media Lab</u>, Changing Places Group and City Science Initiative Cambridge, MA, USA</p>
Jul 2010 - Jun 2012	<p><u>University of Michigan</u> Health System, Radiation Oncology Ann Arbor, MI, USA</p>
Aug 2008 - May 2009	<p>Communication and Marketing Assistant <u>University of Michigan</u>, Informatics Program Ann Arbor, MI, USA</p>
Sep 2006 - Jun 2007	<p>VSAT Engineer and Hub Manager <u>Hughes/Saudi Systems Corp</u> Riyadh, Saudi Arabia</p>
Summer 2005	<p>Consulting Intern <u>Atos Origin</u> Middle East Riyadh, Saudi Arabia</p>
PROFESSIONAL ACTIVITIES	
Mar 2019 - current	<p>Founder/Executive 5+ years <u>Saudi Rowing Federation</u> Riyadh, Saudi Arabia Appointed Chairman by a Royal Decree Established organization from the ground. Developed Federation strategy, finances, teams, identity, regulation, plans, constitutions, events, competitions, KPIs, etc.</p>
2011 - 2013	<p><u>Butterfly LLC</u> Ann Arbor, MI, USA - Riyadh, Saudi Arabia Design and Innovation Consulting Company.</p>
2011	<p><u>My Vienna Gelato</u> Beverly Hills, CA, USA Won Best Gelato Award.</p>
2105	<p>Organizer/ Volunteer Research @ ML</p>
2010, 2011	<p>IxDA Ann Arbor Local Leader.</p>
2009 - 2012	<p>TEDxUofM</p>
4 - 9 Apr 2009	<p>ACM Conference on Human Factors in Computing Systems (CHI), Boston, US.</p>
21 - 23 Nov. 2005	<p>First national IEEE Geographical Information System. Khobar, Saudi Arabia.</p>
16 - 18 May 2005	<p>12th Annual IEEE Technical Exchange Meeting (TEM). KFUPM, Saudi Arabia.</p>
29 Nov. - 1 Dec. 2004	<p>International Conference on Information & Computer Science. Saudi Arabia.</p>
13 - 14 April 2004	<p>11th Annual IEEE TEM. KFUPM, Saudi Arabia.</p>
2013, 2014	<p>Reviewer IEEE International Conference on Tools with Artificial Intelligence (ICTAI).</p>

since **Member**
2009 IxDA.
2007 ACM SIGCHI.
2003 IEEE.

PUBLICATIONS

Peer-Reviewed
Articles

Hadhrawi, M., Church, L. and Blackwell, A.F. (2017). A systematic literature review of Cognitive Dimensions. In *Proceedings of PPIG 2017 - the 28th Annual Workshop of the Psychology of Programming Interest Group*.

Hadhrawi, M. K., and Larson, K. (2016). Illuminating LEGOs with Digital Information to Create Urban Data Observatory and Intervention Simulator. In *Proceedings of the 2016 conference on Designing Interactive systems*. ACM.

Alfaris, A., Khiyami, A., Alawad, A., Alsaati, A., & Hadhrawi, M. (2015). The Integrated Energy Decision Support System. In *Systems Engineering*.

Aldawood, S., Aleissa, F., Almalki, A., Alrashed, T., Alhindi, T., Alnasser, R., ... & Al-Wabi, A. (2015). Collaborative Tangible Interface (CoTI) for Complex Decision Support Systems. In *Design, User Experience, and Usability: Users and Interactions* (pp. 415-424). Springer International Publishing.

Hadhrawi, M. K., Wang, Y., Lex, A., & Larson, K. (2014). CreativeCities: What Makes Cities Creative. In *IEEE InfoVis*. IEEE.

Hadhrawi, M. K., Nouh, M., Alfaris, A., & Sanchez, A. (2013). CoPI: a web-based collaborative planning interface platform. In *Human Interface and the Management of Information. Information and Interaction for Learning, Culture, Collaboration and Business*, (pp. 287-296). Springer Berlin Heidelberg.

Nouh, M., Hadhrawi, M., Sanchez, A., & Alfaris, A. (2013, October). Towards cloud-based decision support platform for group decision making. In *Systems, Man, and Cybernetics (SMC), 2013 IEEE International Conference on* (pp. 50-55). IEEE.

Nouh, M., Hadhrawi, M., Sanchez, A., & Alfaris, A. (2013). A Collaborative Web-based Decision Support Platform for Planning Complex Engineering Systems: A Design and Architecture Framework. In *2013 EURO Working Group on Decision Support Systems (EWG-DSS)*.

Work-in-Progress

Hadhrawi, M. K., and Blackwell, A.F. Sensation in Tangible Programming. In *Proceedings of PPIG 2021 - the 32th Annual Workshop of the Psychology of Programming Interest Group*. [to be submitted]

Hadhrawi, M. K., Miranowski, D. K., Ramasubramanian, V., Sanchez D. O. (2017) SoundScape: Sound Enabled Shape-Changing Material. In *CHI'17 extended abstracts on Human factors in computing systems*. ACM. [to be submitted]

Hadhrawi, M. K. & Alfaris, A. (2017). Interactive Visualization for Complex Systems. *Interactions*. [to be submitted]

RESEARCH

2018 - 2019

InDocs, CCES, University of Cambridge
Principle Investigator

- Redesigned the Tangible IFTTT to support children education in learning programming concepts
- Setting-up a qualitative study to evaluate the use of Code Block with children in a school environment

- 2018 - 2019 **Code Block, Engineering Design Center, University of Cambridge**
- Redesigned the Tangible IFTTT to support children education in learning programming concepts
 - Setting-up a qualitative study to evaluate the use of Code Block with children in a school environment
- 2016 - 2018 **Tangible IFTTT, Computer Laboratory, University of Cambridge**
PhD Research Leader
- Research question: Can we use sensations as basis for tangible and intangible programming languages.
 - Designed and developed a tangible trigger-action (if this then that) programming language to interact with home IoT devices.
 - Investigated the sensations involved in programming IoT devices using a qualitative approach.
- 2015 - 2016 **CityGame, Changing Places Group, MIT**
Research Leader, Master Thesis
- Hypothesis: a Tangible User Interface is more effective for multi-objective group decision making than a graphical or multitouch user interface.
 - Interviewed multiple stakeholders to understand the decision making process in urban planning.
 - Defined the points of contentions and cooperation between the players (potential stakeholders).
 - Developed a web-based graphical and tangible interface for a city planning negotiation game.
 - Setup an in-between subjects study to evaluate the different interfaces with different users.
- 2013 - 2016 **CityScope, Changing Places Group, MIT**
Research Leader
- Developed tangible interface to interact with the CityScope LEGO model using object detection and image processing techniques.
 - Setup 3D projection with multiple projectors.
 - Developed a visualization tool to compare cities and to discover what makes cities creative.
 - Developing a framework to support decision makers in their analysis using interaction.
 - Designing an interface to simplify the interaction with complex system.
 - Developed a multitouch table-top display with object detection system.
 - Developing an Agent-Based Model to simulate pedestrian and transportation pattern within a neighborhood
- 2012 - 2013 **Boeing Decision Support Center, KACST - Boeing**
- Investigated digital workspaces to support large datasets interaction, visualization and simulation.
 - Investigated immersive environments to support group simulation and collaboration
- 2011 - 2013 **SIPS: Sustainable Infrastructure Planning Systems, CCES**
Research Leader
- Investigated decision process in governments and organizations.
 - CPI: developed a web based collaborative planning interface.
 - Investigated different framework architecture to develop CPI architecture.
 - Evaluated existing visualization techniques.
 - Visualized large datasets stored in non-relational database.
 - Fabricating a digital workspace for physical collaboration.
 - Conducted research in decision making.
 - Investigated different modeling techniques.
- 20011 - 2012 **CollabEval: Collaborative Tools to Support Remote Collaboration, CCES**
- Evaluated web-based collaboration tools to support communication, file sharing and time management activities between CCES Riyadh and Cambridge sites.
 - Applied a competitive analysis comparison on the selected tools based on desirability, feasibility, reliability and viability.

2011 - 2012 **CDL: Collaborative Design Lab, CCES**

Project Leader

- Designed state of the art lab aimed to connect researchers between Riyadh, Saudi Arabia and Cambridge, USA into a single virtual lab.
- Designed a visualization wall to visualize large data sets on multiple domains, in addition to helping distant researches communicate.

2009 - 2011 **Treatment Planning System, UMHS**

- Investigated synergies between physician, physicists and dosimetrists.
- Investigated treatment team - tools interaction.
- Designed and developed web portal and desktop import interfaces.
- Designed and developed treatment machine interface.
- Investigated physical and digital workspaces.

2009 - 2011 **MC Research: Ann Arbor Hands On Museum, UM**

Research Assistant (volunteered) at the School of Information

- Investigated children-exhibit interaction to enhance learning experience.
- Developed and iPhone application to guide children in their interaction with exhibits.

Summer 2009 **APRIL, College of Electrical Engineering and Computer Science, UM**

Investigating methods to create a motion preferences module for robots.

Spring 2009 **ADLER Planetarium, Space Visualization Lab, Chicago, IL**

Team Leader

- Conducted a usability study on the use of Microsoft tags (TagReader app on the iPhone and other smart phones) for lab exploration.
- Recommended ways to improve visitors experience and their interaction with exhibits.

2008 - 2009 **Informatics Program Website, UM**

- Created a generalized transition network for the previous Informatics website.
- Designed and maintained a new website using css/html.

Sep 2006 - Jun 2007 **Ministry of Foreign Affairs Satellite Network**

- Monitored the organization Very Small Aperture Terminal (VSAT) satellite network.
- Supervised and engaged in the installation of satellite network system in multiple sites.
- Managed effectively group of people with varying languages and background.

Summer 2005 **SADAD, Saudi Arabian Monitory Agency Electronic Transactions**

- Designed and developed an application for electronic bill payments.
- Monitored network operations and activities.

PROJECTS

Winter 2014 **CreativeCities Visualization Tool, Harvard**

Data Visualization

- Investigating what makes cities creative within a neighborhood level.
- Collected and analyzed BigData.
- Visualized data using D3.
- Developed a web-based analytic tool to compare cities.

Fall 2013 **SoundScape: Sound Enabled Shape-Changing Material, MIT**

Tangible Interfaces

Designed interactive prototype of visualizing economic data of distressed communities through interactive maps.

- Winter 2009 **UM Community Economic Adjustment Program, UM**
Project Leader, Information Visualization
 Designed interactive prototype of visualizing economic data of distressed communities through interactive maps.
- Winter 2009 **GlobaLens: A service Design Evaluation, UM**
- Applied the principles of service innovation to Globalens to enhance the existing features.
 - Proposed new features that would give Globalens a competitive edge over other Business Cases' providers.
- Fall 2008 **ANDOR; Individually-Boxed Shoe Store, UM**
 Information Architecture
 Designed the website wireframe that extends the physical store experience online.
- Fall 2008 **Bugs 2.0: Enhance the Collaboration between Developers and Novice Bug Reporters, UM**
 Computer Supported Cooperative Work
- Interviewed developers and project managers to understand bug reporting response.
 - Designed a web interface bug reporting component to improve bug tracking process.
- Winter 2008 **UM Wolverine Access Advisement System, UM**
 Evaluation of Systems and Services
 Evaluated the success in accomplishing the user organizational goals.
- Winter 2008 **Microsoft Sync, UM**
 Human Behavior
- Investigated how Microsoft SYNC system would affect human attention while driving.
 - Studied the frustration occurred in using the system, and measuring the attention level on multiple tasks while driving.
- Fall 2007 **MuseComp: Ann Arbor Hands On Museum, UM**
Project Leader, Interface and Interaction Design
- Designed a tour guide application for mobile devices.
 - Developed an iPhone App.
- Winter 2006 **3 Degree of Freedom (DoF) Robot Arm, KFUPM**
 Fabricated and designed a 3DoF robot arm
- Configured the arm control.
 - The robot arm is to be controlled over the university Local Area Network (LAN).
- Winter 2006 **SEMS, KFUPM**
 Hardware Group Leader
- Designed and built a wearable device for elderly that track their health progress.
 - Built a robot guide to assist people with deficiencies inside hospitals.
- Winter 2006 **VLSI Design, KFUPM**
- Designed a serial to Parallel Data converter.
 - This includes logic design, transistor level, and VLSI (Very Large Scale Integration) circuit design.
- Fall 2005 **Stairs-Climbing Robot, KFUPM**
 Designed and fabricated the robot to detect and climb stairs with a leveled surface (load area).
- Programmed the robot controller using a RabbitCC micro controller.
 - Fabricated the robot printed circuit board (PCB).

Multi-location LAN Design, KFUPM

Fall 2005

Group Leader

- Designed an enterprise network for MoTex (a modern textile company).
- The network connects multiple-floors building, and multiple branches in different cities.
- The network is designed to fulfill MoTex requirements of reliability, redundancy, performance, efficient manageability and cost effectiveness.

PROFESSIONAL COURSES, TRAININGS AND WORKSHOPS

July, 2012

System Dynamics Workshop, MIT.
Agent Based Modeling Workshop, MIT.

June, 2012

CX202: Complex Systems Modeling and Network Course, NECSI, Cambridge, MA.

January, 2012

GIS Training Course, KACST.

January, 2007

SKYWAN network installation, commissioning & operation, NDSatcom, Riyadh, Saudi Arabia.

April, 2006

Workshop on Business Ethics, KFUPM.

May, 2005

Workshop on How to Start a Small Business, KFUPM.
Workshop on Leadership & Teamwork Skills, KFUPM.

April, 2005

Workshop on Advanced Learning Skills, KFUPM.
Workshop on Brain and Thinking Abilities Skills, KFUPM.

March, 2005

Workshop on Developing Creativity, KFUPM.

AWARDS

2013 - 2020

King Abdulaziz City for Science and Technology, Full Scholarship: covers tuition and living expenses.

2012

New England Complex Systems Institute (NECSI) Scholarship.

2011

Startup Weekend Ann Arbor, 3rd Place Award.

2008

Best project award ExpoSition, MuseComp.

2007 - 2009

King Abdullah Full Scholarship: covers tuition and living expenses.

2006

University Distinction, KFUPM.
Dean's List, CCSE, KFUPM.
Best project award, 3DoF Robot Arm, KFUPM.

2005 - 2006

Atos Origin ME Scholarship: covers living expenses.

SKILLS

Languages

Fluent in English & Arabic, and Beginner in German and Spanish.

Design Tools

Adobe Creative Suite, 3DsMax and Blender.

Programming

C++, Objective-C, Django, Python, Java, Assembly, PHP and C.

Scripting

Processing, HTML/CSS, Javascript, JQuery, D3

Other

Object recognition, Image processing and Agent Based Modeling

INTERESTS

Research	Human-Computer Interaction, big-data interactive visualization, tangible interfaces, decision making, collaborative digital workspaces, and visual analytics and data exploration.
Intellectual	Improving language and intercultural social skills, neuroscience, and robotics.
Activities	Competitive Rowing, fencing, horseback riding, competitive ballroom dancing, drawing, traveling, and skydiving.

SPORTS

2019 - 2020	Saudi Rowing Federation, Saudi Arabia <ul style="list-style-type: none">• National Team, Elite Athlete• Bronze Medal at Bled International Regatta (LM2x)
2017 - 2018	Cambridge University Lightweight Rowing Club (CULRC), United Kingdom <ul style="list-style-type: none">• Athlete/crew boat team member (LM8+, LM4x, LM1x)• British Universities & Colleges Sport (BUCS) Regatta, (M8+)
2016 - 2018	Darwin College Rowing Club (DCRC), United Kingdom <ul style="list-style-type: none">• Coach• Athlete/crew boat team member (M8+)
2016 - 2019	Cantabrigian Rowing Club (CRC), United Kingdom <ul style="list-style-type: none">• Athlete/crew boat team member (M8+, LM1x, M4+, M4x)• Winner at Peterborough Regatta (M4+)• Winner at Peterborough Regatta (M8+)
2013 - 2016	MIT Rowing Club (MITRC), United States <ul style="list-style-type: none">• Athlete/crew boat team member (M8+, M4+)• Gold Medal at DGIST Prestigious International Regatta (M8+), South Korea• Bronze Medal at DGIST Prestigious International Indoor Rowing Relay, South Korea• Silver Medal at Textile River Regatta (TRR) (M4+), United States• Bronze Medal at Textile River Regatta (TRR) (Mix8+), United States• Bronze Medal at Laurance Regatta (M8+), United States• Bronze Medal at Laurance Regatta (M8+), United States• Bronze Medal at Halloween Regatta (Mix8+), United States
2009 - 2011	UM Ballroom Dancing Team, United States <ul style="list-style-type: none">• 1st place US National (Star Ball)• Variant awards on different levels at different competitions• Latin and International
2001 - 2006	KFUPM Fencing Team, Saudi Arabia <ul style="list-style-type: none">• Épée, Dhahran
1992 - 1999	Pre-University Sport Career, Saudi Arabia <ul style="list-style-type: none">• Horseback riding, Riyadh• Karate blue belt, Riyadh• Table Tennis, Riyadh