RESEARCH INITIATIVES
2015-16
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FROM
THE DEAN

The large body of research in science and technology at Carnegie Mellon is tangible proof of an institution that cultivates hard work, critical thinking and creativity. At Carnegie Mellon University in Qatar, we encourage faculty and students to learn, explore and research in this tradition.

The primary goal of CMU-Q is to educate undergraduate students in the fields of biological sciences, business administration, computational biology, computer science and information systems. Many faculty members in each of these disciplines, as well as those who teach coursework in general education, pursue their own research interests. This research is a crucial part of the university environment, stimulating thought, raising challenging questions and gaining new understanding.

For students, participating in research helps sharpen the skills of creativity and critical thinking. Through undergraduate research, some students find inspiration to continue their studies and pursue careers in research. For others, the intellectual rigor of research is invaluable experience in problem solving, and they can apply these skills in their professional careers, regardless of the industry.

*Research Initiatives 2015-16* is a synopsis of faculty and student research over the academic year. I encourage you to read through to learn about the type of thought and inquiry taking place at Carnegie Mellon University in Qatar.

**Ilker Baybars**
Dean and CEO
Carnegie Mellon University in Qatar
During the 2015-16 academic year, construction was underway for a new biological sciences laboratory that will be used for teaching, as well as faculty and undergraduate research.
A research institute like no other, Carnegie Mellon is home to the world's leading experts in a range of fields. In this tradition, Carnegie Mellon Qatar nurtures and develops opportunities for faculty members and students to build regionally relevant research programs in their areas of expertise.
Most faculty members contribute to the CMU-Q body of work through studies funded by Qatar National Research Fund (QNRF) and internal seed research funds.

Ongoing funded projects

- Role of the PDZ and LIM containing protein Zasp in integrin-mediated cell adhesion, Mohamed Bouaouina
- New mathematical models for the large strain swelling response of biological tissues: Applications to edema, inflammation, and pregnancy, Hasan Demirkoparan
- Towards mobile opportunistic cloud computing: Enabling generic computational offloading to extreme heterogeneous entities, Khaled Harras
- Testing English reading comprehension through deep text analysis and question generation, Kemal Oflazer
- SLATE-Q: Scaffolding literacy in academic and tertiary environments: The case of communication in information systems, Silvia Pessoa
- Development of novel antibiotic, antiparasitic and anticancer agents, Gordon Rule

New Research

- Arabic author profiling for cyber security, Anis Charfi

Annual Research Conference (ARC)

CMU-Q had a strong presence at Qatar Foundation’s Annual Research Conference, with Maher Hakim, associate teaching professor of entrepreneurship, moderating the keynote panel discussion at the opening plenary. CMU-Q also shared the breadth of its research initiatives through 11 poster and oral presentations.
ARC posters and presentations

- Characterizing novel Bacillus-like bacteriophage isolated from Qatari sand, Aya Abd Elaal, Annette Vincent
- Arabic multi-genre corpus diacritization annotation, Houda Bouamor, Wajdi Zaghouani, Mona Diab, Ossama Obeid, Kemal Oflazer, Mahmoud Ghoneim, Abdelati Hawwari
- Effective high-level coordination programming for decentralized and distributed ensembles, Ali Elgazar, Edmund Lam, Iliano Cervesato
- A distributed and adaptive graph simulation system, Pooja Nilangekar, Mohammad Hammoud
- Alice in the Middle East: Computing curriculum for K-12, Saquib Razak, Hanan Alshikhabobakr, Huda Gedawy
- Improving reading: From teacher development to student reading, Dudley Reynolds, Zohreh Eslami, Maha Cherif Ellili, Nancy Allen, Samah Al-Sabbagh
- Thymidylate kinases as targets for drug discovery, Gordon S. Rule, Ian Fucci, Kaustubh Sinha
- Analysis of Qatar’s bacteriophage genome, Umm-Kulthum Umlai, Annette Vincent, Valentin Ilyin
- Sampling of Qatari sand microbes, Umm-Kulthum Umlai, Annette Vincent and Valentin Ilyin
- Annotation guidelines and framework for Arabic machine translation post-edited corpus, Wajdi Zaghouani, Nizar Habash, Ossama Obeid, Behrang Mohit, Houda Bouamor, Kemal Oflazer
- Building an Arabic punctuated corpus, Wajdi Zaghouani, Dana Awad
Completed Projects

**Effective programming for large distributed ensembles**

Lead PI: Iliano Cervesato  
Co-PI: Frank Pfenning

Investigators developed a programming methodology and accompanying language for effectively programming concurrent and distributed applications. Researchers developed a system-centric language and applied it successfully to a number of mobile distributed applications.

**Innovative computing and mobile technology for improving English literacy skills for children and for adults**

Lead PI: M. Bernardine Dias  
Co-Lead PI: Silvia Pessoa  
Co-PI: Yonina Cooper

To understand the needs of English literacy learners and educators, and to develop relevant educational technology tools, a novel scalable educational game framework was created that motivates learners to interact with educational content.

**Automatic correction of Standard Arabic text: Resource and system development**

Lead PI: Nizar Habash, Columbia University  
Co-Lead PI: Kemal Oflazer

This project developed a suite of novel resources, algorithms and methods to study the challenges of correcting Arabic text automatically, addressing errors in spelling, lexical choice and grammar. The techniques developed during this project will help in achieving significant improvements in other Arabic NLP efforts.

**Advancing Arabic Learning in Qatar**

Lead PI: Zeinab Ibrahim  
PI: Andreas Karatsolis  
Co-PI: Amal Al-Malki

This project used tabletop touch-screen surface technology for teaching Modern Standard Arabic (MSA) to pre-elementary students in the classroom, resulting in a two-year Arabic language curriculum for pre-elementary children incorporating state-of-the-art language learning pedagogies.

| Divakaran Liginlal, Raising language effectiveness in Arabic e-commerce websites |
Raising language effectiveness in Arabic e-commerce websites

Lead PI: Divakaran Liginlal
Co-PIs: Robert Meeds, Rizwan Ahmad, Qatar University

The project examined the use of metaphors in Arabic language e-commerce websites and demonstrated that metaphorical language enhances the effectiveness of websites and e-commerce businesses; findings are valuable for Arabic content creators and translators.

New Mathematical Models for the Large Strain Swelling Response of Biological Tissues

Lead PI: Thomas J. Pence, Michigan State University
Co-Lead PI: Hasan Demirkoparan

The project created and improved scientific methods for providing a mathematical modeling capability for the mechanical behavior of soft biological tissue in response to swelling. A key result was a mathematical model for soft tissue swelling and a finite element simulation capability for how swelling affects organ systems.

Improving reading skills in the middle school science classroom


To enhance student comprehension of scientific texts, the project developed a curriculum model for integrated instruction in reading and science, as well as a lesson study to change and develop teachers’ instructional beliefs and practices.

Cooperative Robotic Boats for Monitoring Coastal and Flooded Areas

Lead PI: Paul Scerri
Co-Lead PI: Khaled Harras

To coordinate cooperative watercraft for environmental monitoring, low-cost and efficient data collection, a new approach and language was developed to achieve large scale coordination.
Student Research

The Meeting of the Minds research symposium is a highlight of the academic year, a celebration of the ingenuity, hard work, scientific exploration and intellectual curiosity that characterizes students in all disciplines at CMU-Q.

Meeting of the Minds, 2016

Best Projects

• Characterizing a novel Bacillus-like phage from Qatar’s sand, Aya Abd Elaal
• Wireless eruptions - Reprogramming wireless sensor networks: Challenges and approaches, Aliaa Essameldin
• Role of DNAJB3/ HSP-40 in maintaining metabolic homeostasis, Bushra Memon

Best Poster

• CheckMyStack vulnerability detection tool for the Qatari web, Aseel Ghazal, Daanish Ali Khan

Ministry of Development Planning and Statistics Awards

• A web-based framework for Arabic text diacritization annotation, Ossama Obeid, Wajdi Zaghouni, Houda Bouamor, Kemal Oflazer, Mona Diab, Mahmoud Ghoneim, Abdelati Hawwari
• Temporal patterns in Qatar’s particulate air pollution, Syed Abbas Mehdi and Nourhan ElKhatib
• Microbiology-based educational kit for high school students in Qatar, Wadha Al-Marri
• Designing services in healthcare: A research collaboration with Hamad General Hospital, Shaikha Al-Thani
• Helping Qatar’s disabled: Identifying web accessibility problems, Dana Al-Muftah

Qatar National Research Fund (QNRF) Awards

Best Project

• Drone-Be-Gone: Agile low-cost vision-based UAV cyber physical testbed, Sidra Alam, Khaled A. Harras; Qatar University: Mouhyemen Khan, Amr Mohamed
Undergraduate Conference in Information Systems (UCIS)

Best Paper
- ICT-TRAVEI: Mobile public transport companion for the visually impaired, Cui Linting, Kenny Ngo, Benjamin Gan Kok Siew, Singapore Management University
- A study of web accessibility and related policy implications to Qatar, Dana Al-Muftah, CMU-Q

Best Presentation
- Beating the stock market: Measuring the predictive power of Twitter sentiment analysis, Alex Isken, Marquette University
- A study of web accessibility and related policy implications to Qatar, Dana Al-Muftah, CMU-Q

Best Slam Presentation
- Spark, Nathan Oh, Aditi Sarkar, Skylar Weaver, CMU

Best Poster
- Restoring freedom to Parkinson’s patients, Amal Al-Dahneem, Shaikha Al-Thani, Noor Al-Qaedi, Juan Sam, CMU-Q
- FlierCal, Matt Nielsen, Maggie Li and Ankur Toshniwal, CMU

Notable international conference presentations
- 74th Annual Scientific Meeting of the American Psychosomatic Society, Denver, Colorado. “Validity and reliability of the Arabic version of the Perceived Stress Scale (PSS-10).” and “Stress, mental and physical health, and social media usage among Arabic speaking undergraduates in the Middle East.” Alaa Khader, Aya Gaballa, Fatima Amir, Narjis Premjee, Bayan Khaled

The Undergraduate Conference in Information Systems creates a venue for students and faculty from around the world to present and engage with cutting edge undergraduate research. The conference theme this year, “Humanizing IT,” invited participants to consider the evolving role of IT in all facets of human life.
Carnegie Mellon University in Qatar

| A quiet courtyard at CMU-Q |
APPENDICES

NPRP grants
Meeting of the Minds posters
Publications and presentations by faculty members
Senior Honors Theses
## Appendix 1

National Priorities Research Program (NPRP) grants awarded to Carnegie Mellon faculty

<table>
<thead>
<tr>
<th>LEAD PI IN QATAR</th>
<th>NPRP</th>
<th>TITLE</th>
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<tbody>
<tr>
<td>Cycle 1</td>
<td></td>
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<tr>
<td>Amal Al-Malki</td>
<td>NPRP 29-6-7-9</td>
<td>Images of Muslim women in translated Mideast media sources: A content and discourse analysis</td>
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<tr>
<td>Majd Sakr</td>
<td>NPRP 29-6-7-24</td>
<td>Human-robot interaction in an Arabic social and cultural setting</td>
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<td>M. Bernardine Dias</td>
<td>NPRP 1-7-7-5</td>
<td>Automated tools for effective team coordination in emergency response</td>
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<tr>
<td>M. Bernardine Dias</td>
<td>NPRP 30-6-7-91</td>
<td>Enhanced education for the visually and aurally impaired using automated tutors and interactive computer games</td>
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<tr>
<td>Jonathan Caulkins</td>
<td>NPRP 20-6-7-6</td>
<td>Modeling control of infectious disease</td>
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<tr>
<td>Charles Thorpe</td>
<td>NPRP 29-6-7-43</td>
<td>Intelligent diabetes assistant: Predicting and optimizing blood glucose</td>
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<td>Aziz Lookman</td>
<td>NPRP 30-6-7-28</td>
<td>Are banks better at managing their borrower’s risks than non-banks</td>
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<td>Cycle 2</td>
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<tr>
<td>Alex Rojas Pena</td>
<td>NPRP 08-643-1-112</td>
<td>Automated measurement of galaxy morphology</td>
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<td>Brett Browning</td>
<td>NPRP 08-589-2-245</td>
<td>Non-destructive gas pipeline inspection using computer vision</td>
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<tr>
<td>Khaled Harras</td>
<td>NPRP 08-562-1-095</td>
<td>CameraNets: Coverage, networking, and storage problems in wireless multimedia sensor networks</td>
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<tr>
<td>Kemal Oflazer</td>
<td>NPRP 08-485-1-083</td>
<td>Improved Arabic natural language processing through semi supervised and cross-lingual learning</td>
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<td>Cycle 3</td>
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<tr>
<td>Silvia Pessoa</td>
<td>NPRP 09-857-5-123</td>
<td>Transnational labor migration in Qatar: An empirical sociological analysis</td>
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<td>Kemal Oflazer</td>
<td>NPRP 09-1140-1-177</td>
<td>Learning from comparable corpora for improved English-Arabic statistical machine translation</td>
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<tr>
<td>Brett Browning</td>
<td>NPRP 09-980-2-380</td>
<td>Robust localization and mapping for autonomous gas inspection vehicles</td>
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<tr>
<td>Majd Sakr</td>
<td>NPRP 09-1116-1-172</td>
<td>Qloud: Towards a cloud computing infrastructure in Qatar to target regional scientific applications</td>
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<tr>
<td>Majd Sakr</td>
<td>NPRP 09-1113-1-171</td>
<td>Towards natural multi-cultural human-robot interaction</td>
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<tr>
<td>Kemal Oflazer</td>
<td>NPRP 09-1113-1-171</td>
<td>A natural language processing-based active and interactive platform for accessing English language content and advanced language learning</td>
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<tr>
<td>Iliano Cervesato</td>
<td>NPRP 09-1107-1-168</td>
<td>Formal reasoning about language for distributed computation</td>
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<td>Iliano Cervesato</td>
<td>NPRP 09-667-1-100</td>
<td>Effective programming for large distributed ensembles</td>
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<td>M. Bernardine Dias</td>
<td>NPRP 4-439-1-071</td>
<td>Innovative computing and mobile technology for improving English literacy skills for children and for adults</td>
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<td>M. Bernardine Dias</td>
<td>NPRP 4-1330-1-213</td>
<td>Cooperative robotic boats for monitoring coastal and flooded areas</td>
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<td>Andreas Karatsolis</td>
<td>NPRP 4-1538-6-048</td>
<td>Improving professional communication skills through an online tutorial</td>
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<td>Iliano Cervesato</td>
<td>NPRP 4-341-1-059</td>
<td>Usable automated data inference for end-users</td>
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<td>Dudley Reynolds</td>
<td>NPRP 4-1172-5-172</td>
<td>Improving reading skills in the middle school science classroom</td>
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<td>Majd Sakr</td>
<td>NPRP 4-1058-1-168</td>
<td>Automatic correction of Standard Arabic text: Resource and system development</td>
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<td>Hasan Demirkoparan</td>
<td>NPRP 4-1138-1-178</td>
<td>New mathematical models for the large strain swelling response of biological tissues</td>
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<td>Hasan Demirkoparan</td>
<td>NPRP 4-1333-1-214</td>
<td>Complex material response described by continuum mechanics with a deformation gradient product decomposition that has novel hyperelastic implications</td>
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<tr>
<td>Zeinab Ibrahim</td>
<td>NPRP 4-1074-5-164</td>
<td>Advancing Arabic language learning in Qatar</td>
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<td>Vinay Kolar</td>
<td>NPRP 4-1620-1-266</td>
<td>Large-scale, personal and mobile sensor networks and their applications in Qatar</td>
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<td>Krishnapuram Karthikeyan</td>
<td>NPRP 4-783-1-119</td>
<td>Plant uptake of pollutants of emerging concern during use of reclaimed water in greenhouse hydroponic systems</td>
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<td>Krishnapuram Karthikeyan</td>
<td>NPRP 4-718-2-268</td>
<td>Use of novel water treatment methods for desalination of brackish groundwater in Qatar</td>
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<td>Davide Fossati</td>
<td>NPRP 5-939-1-155</td>
<td>Intelligent learning environments for computer science undergraduate education</td>
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<td>Divakaran Liginlal</td>
<td>NPRP 5-1393-6-044</td>
<td>Raising language effectiveness in Arabic ecommerce websites</td>
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<td>Yonina Cooper</td>
<td>NPRP 5-1070-2-451</td>
<td>Alice for Middle East—Alice ME</td>
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<td>Silvia Pessoa</td>
<td>NPRP 5-1320-6-040</td>
<td>Undergraduate discipline-specific writing: Expectations, demands, and development</td>
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<td>Kemal Ofliazer</td>
<td>NPRP 6-1020-1-199</td>
<td>OPTDIAC: An optimal diacritization scheme for Arabic orthographic representation</td>
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<td>Jonathan Finkel</td>
<td>NPRP 6-1130-3-267</td>
<td>Adherence and biofilm formation of pathogenic yeast and yeast-like fungi from the Qatari clinical setting</td>
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<td>Mohamed Bouaouina</td>
<td>NPRP 7-1872-1-331</td>
<td>Role of the PDZ and LIM containing protein Zasp in integrin-mediated cell adhesion</td>
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<td>Iliano Cervasato</td>
<td>NPRP 7-988-1-178</td>
<td>Automated verification of properties of concurrent, distributed and parallel specifications with applications to computer security</td>
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<td>Mohammad Hammoud</td>
<td>NPRP 7-1330-2-483</td>
<td>Scalable analytics engine for big graphs on the cloud</td>
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<td>Dudley Reynolds</td>
<td>NPRP 7-1393-5-209</td>
<td>Learning4Teaching-Qatar: Examining Qatari teachers’ experiences of professional development in English language teaching</td>
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<td>Snezhana Abarzhi</td>
<td>NPRP 7-1785-1-321</td>
<td>Numerical and theoretical modeling of complex fluid flows</td>
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<td>Kemal Ofliazer</td>
<td>NPRP 7-290-1-047</td>
<td>MADAR: Multi-Arabic dialect applications and resources</td>
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<td>Kemal Ofliazer</td>
<td>NPRP 8-1337-1-243</td>
<td>Testing English reading comprehension through deep text analysis and question generation</td>
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<td>Khaled Harras</td>
<td>NPRP 8-1645-1-289</td>
<td>Towards mobile opportunistic cloud computing: Enabling generic computational offloading to extreme heterogeneous entities</td>
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<td>Silvia Pessoa</td>
<td>NPRP 8-1815-5-293</td>
<td>SLATE-Q: Scaffolding Literacy in Academic and Tertiary Environments: The case of communication in information systems</td>
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<td>Gordon Rule</td>
<td>NPRP 8-2225-1-439</td>
<td>Development of novel antibiotic, antiparasitic and anticancer agents</td>
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<td>Hasan Demirkoparan</td>
<td>NPRP 8-2424-1-477</td>
<td>New mathematical models for the large strain swelling response of biological tissues: Applications to edema, inflammation, and pregnancy</td>
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<td>Anis Charfi</td>
<td>NPRP 9-175-1-033</td>
<td>Arabic author profiling for cyber security</td>
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Appendix 2
Meeting of the Minds posters

**Biological Sciences Posters**
Possible alternative to chimeric placental and intestinal alkaline phosphatase in the treatment of acute kidney disease
Inhibition of bacterial alkaline phosphatase by L-phenylalanine
Development of educational protein assay for secondary schools in Qatar
Characterizing a novel bacillus-like phage from Qatar's sand
Role of DNAJB3/HSP-40 in maintaining metabolic homeostasis
The effect of pH on the activity and affinity of alkaline phosphatase
Analysis of microbiome in water systems in Doha
Comparison of kinetic behavior between *E. coli* and calf-intestinal alkaline phosphatase using nitrophenyl phosphate (NPP)
Effect of aspartame on malate aspartate shuttle in MDCK cells
Isolation, purification, and complete genome sequence of *Bayan* bacteriophage, a potential therapeutic tool for tuberculosis
Acute toxicity of saccharine on proximal tubular kidney cells
Inhibition of human placental alkaline phosphatase (PLAP) by L-phenylalanine
Temporal patterns in Qatar's particulate air pollution
Annotation of Qatar's novel *Bacillus*-like phage genome
Microbiology-based educational kit for high school students in Qatar

**Computer Science Posters**
Computer assisted learning using foreign language material
Device-to-device communication in the internet of things: providing development guidelines for IoT enthusiasts
Wireless eruptions—Reprogramming wireless sensor networks: Challenges and approaches
CheckMyStack vulnerability detection tool for the Qatari web
Software defined networking in wireless networks using a Raspberry Pi
Applying recurrent neural network for Arabic named entity recognition
An in-car speech-based interactive recitation correction system
Tweets about Qatar: Who's setting the agenda?
Social media image analysis for public health

**General Education Posters**
Graceful trees and parking functions

**Information Systems Posters**
Helping Qatar's disabled: Identifying our web accessibility problems
Designing services in healthcare: A research collaboration with Hamad General Hospital

**Postgraduate Posters**
A leg in the future of hive mind programming
A web-based framework for Arabic text diacritization annotation
Alice in the Middle East: Computing curriculum for K-12
Cumulus: A distributed flexible computing testbed for edge cloud computational offloading
Detecting and tracking attacks in mobile edge computing platforms
Drone-Be-Gone: Agile low-cost vision-based UAV cyber physical testbed
Extending the range via ad-hoc communication for cooperative robotic watercraft
GraphSim: A distributed and adaptive graph simulation system
NEXCEL: A deductive spreadsheet
The OptDiac Project: Guidelines and framework for a large scale Arabic diacritized corpus
Effect of wave interference on Richtmyer-Meshkov instability
Teacher development for student reading
A study of visual metaphors on Arab e-commerce websites
Websites as cultural expressions: A multimodal analysis of Arabic e-commerce websites
Appendix 3
Publications and presentations by faculty members

Chadi Aoun, associate teaching professor of information systems and Dr. Savanid Vatanasakdakul (Macquarie University) and Karyne Ang (University of Technology Sydney). “Feedback for Thought: Examining the Influence of Feedback Constituents on Learning Experience.” In Journal of Studies in Higher Education.


Alexander R. Wilcox Cheek, assistant teaching professor of information systems. “Designing Organizational Change,” Vodafone Qatar Corporate Social Responsibility Majlis, Doha, Qatar.

Alexander R. Wilcox Cheek, assistant teaching professor of information systems and Silvia Pessoa (CMU-Q) and Thomas Mitchell (CMU-Q). “Working with a Designer: Understanding Writing, Expectations, Explicit Instruction and Improved Writing,” Liberal Arts International Conference, Doha, Qatar.

Benjamin Collier, assistant teaching professor of organizational behavior, and Julia Bear. “Where are the Women in Wikipedia? Understanding the Different Psychological Experiences of Men and Women in Wikipedia.” In Sex Roles.

Hasan Demirkoparan, associate teaching professor of mathematics, and Heiko Topol (CMU-Q). Thomas Pence (Michigan State University) and Alan Wineman (University of Michigan). “Uniaxial load analysis under stretch dependent fiber remodeling applicable to collagenous tissue.” In Journal of Engineering Mathematics.

Hasan Demirkoparan, associate teaching professor of mathematics, Ashraf Hadough (CMU-Q) and Thomas Pence (Michigan State University). “Straightening an annular cylindrical sector that is composed of an internally balanced compressible elastic material,” 9th European Solid Mechanics Conference (ESMC 2015), Leganés-Madrid, Spain.


David Emmanuel Gray, assistant teaching professor of philosophy and Dana Haidan (Vodafone Qatar) and Martin Neureiter (The CSR Company GmbH). “Training and Education for Sustainability Reporting,” Corporate Social Responsibility, Awarding Institutions, and Launch of the White Book Conference, Doha, Qatar.

David Emmanuel Gray, assistant teaching professor of philosophy. “A Better Way to Think About Business Ethics,” Corporate Social Responsibility Majlis on Defining your Corporate Purpose for a Sustainable Change, Doha, Qatar.


Appendix 3
Publications and presentations by faculty members

Starling David Hunter III, visiting associate teaching professor and Susan Smith (American University of Sharjah) and Saba Singh (School of Visual Arts). “Predicting box office from the screenplay: A text analytical approach.” In Journal of Screenwriting.

Starling David Hunter III, visiting associate teaching professor and Susan Smith (American University of Sharjah) and Saba Singh (School of Visual Arts). “Predicting Box Office From The Screenplay: The Role of Network Text Analysis,” International Network of Social Network Analysis, Newport Beach, USA.

Ludmila Hyman, assistant teaching professor. “Gorbachev’s Argument for Perestroika: Forgotten or Remembered?” NCA/ AFA (Alta) Summer Conference on Argumentation, Alta, Utah, USA.

Onur Kesten, associate professor of economics, and Yan Chen, University of Michigan. “College and High School Admissions Reforms in China,” Departmental seminars at Qatar University and Georgetown University.


Ramesh Krishnamurti, professor of architecture, and Kui Yue, Microsoft. “Developing a tractable parametric shape grammar.” In Environment & Planning B: Planning and Design.


Divakaran Liginlal, teaching professor of information systems. “HIPAA and Human Error: The Role of Enhanced Situation Awareness in Protecting Health Information.” In Medical Data Privacy Handbook. Gkoulalas-Divanis and Loukides (Eds.).

Divakaran Liginlal, teaching professor of information systems and Robert Meeds (Qatar University) and Rizwan Ahmad (Qatar University) and Preetha Gopinath (CMU-Q). “Webpages as Cultural Expressions: A Study of Metaphor Use in Arab E-Commerce Web.” In International Journal of Global Information Technology Management.


Divakaran Liginlal, teaching professor of information systems, Rami Yousef (Lusail), Simon Fass (University of Texas at Dallas), and Chadi Aoun (CMU-Q). “Combining Morphological Analysis and Bayesian Belief Networks: A DSS for Safer Construction of a Smart City,” Americas Conference on Information Systems, Puerto Rico.


Thomas D. Mitchell, assistant teaching professor of English and Ryan T. Miller (Kent State University) and Silvia Pessoa (CMU-Q). “Impact of source texts and prompts on students’ genre uptake.” In Journal of Second Language Writing.

Saquib Razak, associate teaching professor of computer science and Huda Gedaway (CMU-Q) and Wanda Dann and Donald Slater (CMU). “Alice in the Middle East: An Experience Report from the Formative Phase,” 47th ACM Technical Symposium on Computing Science Education.

Benjamin James Reilly, associate teaching professor of history. Slavery, Agriculture, and Malaria in the Arabian Peninsula. Oxford University Press.

Appendix 3
Publications and presentations by faculty members


Alicia Salaz, reference and instruction librarian and Teresa MacGregor (CMU-Q). “What Came First, the Whale or the Egg.” In The Discovery Tool Cookbook: Recipes for Successful Lesson Plans by ACRL.


Wajdi Zaghouani, research associate of computer science and Dana Awad (The Lebanese University). “Building an Arabic Punctuated Corpus,” Qatar Foundation Annual Research Conference, Doha, Qatar.

Wajdi Zaghouani, research associate of computer science and Stephan Vogel (QCRI). “Social Entrepreneurship: Improving Literacy in the Arab World Through Ebooks for Children,” Empower Workshops 2016, Doha, Qatar.
Appendix 4
Senior honors theses

Aya Abd Elaal
“Characterizing a novel Bacillus-like bacteriophage from Qatar’s sand.”

Maryam Abdula Hafeez Aghadi
“Effect of aspartame on malate aspartate shuttle in MDCK cells.”

Dana Abdulrahman Al-Muftah
“Identifying special needs for web accessibility in Qatar: A study of web accessibility and related policies in the State of Qatar”

Noora Jassim Al-Muftah
“The discovery of relatedness and population structure in the 1000 Genome Project.”

Clinton Cunha
“Fluorogen-activating single-chain antibodies for tumor detection using Patent Blue V and structurally similar triarylmethane dyes.”

Naasih Ahmad Gopee
“Applying recurrent neural network for Arabic named entity recognition.”

Rayan M.A.M. Hashim
“Acute toxicity of saccharine on proximal tubular kidney cells.”

Alaa Mahmoud Mohamed Khader
“Computer assisted learning for Arabic speaking ESL students.”

Bushra Naushad Memon
“Role of DNAJB3/Heat Shock Protein-40 co-chaperone in maintaining metabolic homeostasis.”

Umm-Kulthum Umlai
“Genome annotation and characterization of first bacteriophage, Shumi, isolated in Qatar from sand.”
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For more than a century, Carnegie Mellon University has challenged the curious and passionate to imagine and deliver work that matters. A private, global university, Carnegie Mellon stands among the world’s most renowned educational institutions, setting its own course with programs that inspire creativity and collaboration. Consistently top-ranked, Carnegie Mellon has more than 13,000 students and 100,000 alumni worldwide.

At the invitation of Qatar Foundation, Carnegie Mellon joined Education City in 2004 to deliver select programs that will support and contribute to the long-term development of Qatar. Today, Carnegie Mellon Qatar offers undergraduate programs in biological sciences, business administration, computational biology, computer science, and information systems. More than 400 students from 40 countries call Carnegie Mellon Qatar home.

Graduates from CMU-Q are highly sought-after: most choose careers in top organizations, both in Qatar and around the world, while a significant number pursue graduate studies at international institutions. With nine graduating classes, the total number of alumni is 570.

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