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From computing to the environment to biotechnology, research at Carnegie Mellon University focuses on finding practical answers to complex problems. As an institution, CMU cultivates hard work, critical thinking and creativity, and research at Carnegie Mellon University in Qatar is no exception.

While the primary goal of CMU-Q is to educate undergraduate students, we encourage faculty members to 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 nurtures the skills of creativity and critical thinking. Some students are inspired 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 2016-17 is a synopsis of the research at CMU-Q over the academic year. I encourage you to read through and learn more about the thought and inquiry taking place at Carnegie Mellon University in Qatar.

Michael Trick
Dean
John O’Brien and Hanbyul Joo are part of a collaborative Qatar and Pittsburgh research team exploring the behavior of successful negotiators.
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.

Faculty Research

New NPRP awards

In May 2017, CMU-Q researchers were awarded four new National Priorities Research Program (NPRP) grants by the Qatar National Research Fund. CMU-Q has been awarded a total of 53 NPRP grants in 10 cycles of funding.

Gianni Di Caro seeks to develop swarms of unmanned aerial and surface robots that are equipped with GPS devices and sensors for marine environmental monitoring.

Saquib Razak will be expanding Alice Middle East by creating a three-year curriculum for local middle schools. Alice ME is an interactive software tool that teaches programming.

Annette Vincent will investigate using bacteriophages—viruses that infect bacteria—as biomonitoring tools to provide a more accurate assessment of water quality. PI: Valentin Ilyin

Ihab Younis will study the molecular indicators of breast cancer, which is the most commonly diagnosed cancer among women in Qatar.
Ongoing NPRP projects

- Role of the PDZ and LIM containing protein Zasp in integrin-mediated cell adhesion
  Lead PI: Mohamed Bouaouina
- Arab author profiling for cybersecurity
  Lead PI: Anis Charfi
- New mathematical models for the large stratin swelling response of biological tissues: Applications to edema, inflammation, and pregnancy
  Co-Lead PI: Hasan Demirkoparan
  Lead PI: Thomas Pence, Michigan State
- Scalable analytics engine for big graphs on the cloud
  Lead PI: Mohammad Hammoud
- Towards mobile opportunistic cloud computing: Enabling generic computation offloading to extreme heterogeneous entities
  Lead PI: Khaled Harras
- MADAR: Multi-Arabic dialect applications and resources
  Co-Lead PI: Kemal Oflazer
  Lead PI: Nizar Habash, New York University Abu Dhabi
- Testing English reading comprehension through deep text analysis and question generation;
  Lead PI: Kemal Oflazer
  PI: Teruko Mitamura, Carnegie Mellon University
- SLATE-Q: Scaffolding literacy in academic and tertiary environments: The case of communication in information systems
  Lead PI: Silvia Pessoa
  PI: Selma Limam Mansar
  PI: Divakaran Liginlal
  PI: Susan Hagan
- Automated verification of properties of concurrent, distributed and parallel specifications with applications to computer security
  Co-Lead PI: Giselle Reis
  Lead PI: Iliano Cervesato, Carnegie Mellon University

The mobile opportunistic cloud computing team is led by Khaled Harras, left, and includes Hend Gedawy, Sannan Tariq and Abderrahmen Mtibaa.

Funded projects fall within the core disciplines of biological sciences, business administration, computational biology, computer science and information systems, as well as complementary areas like mathematics, social sciences, languages, and environmental science.
The National Priorities Research Program (NPRP) is the main funding program of QNRF and the primary means by which QNRF seeks to support research that addresses Qatar’s needs.

### Completed NPRP projects

**Usable automated data inference for end-users**

Lead PI: Iliano Cervesato  
Co-PI: Cleotilde Gonzalez, Carnegie Mellon University  
Investigators established the feasibility of a relational reasoning tool for end-users based on the NEXCEL design and studied how people approach relational reasoning.

**OPTDIAC: An optimal diacritization scheme for Arabic orthographic representation**

Lead PI: Mona Diab, George Washington University  
Co-Lead PI: Kemal Oflazer, Carnegie Mellon University  
Co-Investigator: Houda Bouamor  
This project investigated the semantic disambiguation of Arabic text through optimal diacritization, resulting in several schemes with positive impact on readability.

**Learning4teaching study—Qatar**

Lead PI: Donald Freeman, University of Michigan  
Co-Lead PI: Dudley Reynolds  
Co-Investigator: Abdullah Abu-Tineh, Qatar University  
This project advanced the understanding of how Qatar English language teachers experience professional development and its influences on their classroom teaching.

**Alice in the Middle East**

Lead PI: Saquib Razak  
Co-Lead PI: Wanda Dann, Carnegie Mellon University  
This project localized the Alice tool for the Middle East and created a computing curriculum for K-12 that showed a marked increase in student problem solving skills and computational thinking.
Student Research

Carnegie Mellon has been a leader in undergraduate research for decades. The Qatar Student Initiated Undergraduate Research Program supports student-initiated research and encourages cross-disciplinary projects.

QSIURP
The Qatar Student-Initiated Undergraduate Research Program (QSIURP) awards funding to undergraduates at Carnegie Mellon University in Qatar for summer research in any field of study.

QSIURP projects are research, scholarly, or artistic activities that lead to one or more of the following:

- the production of new knowledge
- increased problem-solving capabilities
- original, critical, or historical theory and interpretation
- the production of art or artistic performance

There are two types of funding available:

- Fellowships: students may apply for up to ten weeks of summer research in any field of study.
- Grants: individuals or groups may apply for grants to assist with required supplies or equipment for research.

QSIURP Cycle 2016-17: Awarded and Completed Projects

A distributed approach to multi-robot collision-free vehicle routing in dynamic environments, Zan Naeem, Mohamed Zakzok
Faculty advisor: Gianni Di Caro

Effect of aspartame on human embryonic kidney cells, Fatema Abdul Salik, Reema Subeh
Faculty advisor: Annette Vincent

Identifying regulators of minor intron splicing in breast cancer cells, Nourhan Elkhatib, Reem Elasad
Faculty advisor: Ihab Younis

Minimizing cost to estimate accuracy of human labeling and automated classifiers, Sabit Hassan, Shaden Shaar
Faculty advisor: Bhiksha Raj
The Meeting of the Minds student research symposium is a celebration of the ingenuity, hard work, scientific exploration and intellectual curiosity that characterizes students in all disciplines at CMU-Q. Using posters, videos and other visual aids, students present their research and project work to a wide audience of faculty, fellow students, family members, industry representatives and the larger community.

At Meeting of the Minds 2017, students presented 27 posters in the disciplines of biological sciences, computer science and information systems. There were two postgraduate posters.

Student research is evaluated by a panel of internal and external judges. In 2017, judges represented Hamad Bin Khalifa University, Hamad Medical Corporation, Ministry of Development, Planning and Statistics, Northwestern University in Qatar, Qatar Biomedical Research Institute, Qatar Computing Research Institute, Qatar Mobility Innovation Center, Qatar National Research Fund, Qatar Science and Technology Park and Weill-Cornell Medicine-Qatar.

In addition to the CMU-Q awards, two organizations present special awards. Dr. Barak Yehya from the Ministry of Development Planning and Statistics presented five awards for research that has particular relevance to Qatar. The Qatar National Research Fund awarded two prizes, one for ‘Best Project’ and one for ‘Best Poster.’
Award winners

**Best Project**
1. MAPK14 minor intron splicing as novel biomarker for breast cancer, **Ettaib El-Marabti**
2. An agile platform for distributed computation in smart IoT environments, **Sannan Tariq**
3. Application based learning to reinforce academic concepts in Qatar biology curriculum, **Mohammad Osaama bin Shehzad**

**Best Poster**
- MAPK14 minor intron splicing as novel biomarker for breast cancer, **Ettaib El-Marabti**

**QNRF**
- **Best Project**: The Hive: An on-edge middleware solution for context and resource sharing in the Internet of Things, **Aliaa Essameldin**
- **Best Poster**: BCL2L11 as gene target of mir-92 and mir-10a: Gene expression, interaction evaluation and implication in type 2 diabetes and obesity, **Alya Al-Kurbi**
- **Ministry of Development Planning and Statistics**
  - Potential food poison analysis of phage DNA collected from Al Khor, **Raghid Bsat**
  - Biofilm formation in water systems in Doha, **Khawla Al-Darwish**
  - Application based learning to reinforce academic concepts in Qatar biology curriculum, **Mohammad Osaama bin Shehzad**
  - The effect of culture on image appeal and social presence in Arab e-commerce websites, **Noor AlQaedi**
  - Arabic author profiling for cybersecurity, **Wajdi Zaghouani, Anis Charfi** (Post-graduate Poster)
My heart is in the work.

Andrew Carnegie
APPENDICES

NPRP GRANTS
PUBLICATIONS AND PRESENTATIONS
MEETING OF THE MINDS POSTERS
Appendix 1
National Priorities Research Program (NPRP) grants awarded to Carnegie Mellon faculty

<table>
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<th>Lead PI in Qatar</th>
<th>NPRP</th>
<th>Title</th>
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<tbody>
<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>
</tr>
<tr>
<td>Majd Sakr</td>
<td>NPRP 29-6-7-24</td>
<td>Human-robot interaction in an Arabic social and cultural setting</td>
</tr>
<tr>
<td>M. Bernardine Dias</td>
<td>NPRP 1-7-7-5</td>
<td>Automated tools for effective team coordination in emergency response</td>
</tr>
<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>
</tr>
<tr>
<td>Jonathan Caulkins</td>
<td>NPRP 20-6-7-6</td>
<td>Modeling control of infectious disease</td>
</tr>
<tr>
<td>Charles Thorpe</td>
<td>NPRP 29-6-7-43</td>
<td>Intelligent diabetes assistant: Predicting and optimizing blood glucose</td>
</tr>
<tr>
<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>
</tr>
<tr>
<td>Alex Rojas Pena</td>
<td>NPRP 08-643-1-112</td>
<td>Automated measurement of galaxy morphology</td>
</tr>
<tr>
<td>Brett Browning</td>
<td>NPRP 08-589-2-245</td>
<td>Non-destructive gas pipeline inspection using computer vision</td>
</tr>
<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>
</tr>
<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>
</tr>
<tr>
<td>Silvia Pessoa</td>
<td>NPRP 09-857-5-123</td>
<td>Transnational labor migration in Qatar: An empirical sociological analysis</td>
</tr>
<tr>
<td>Kemal Oflazer</td>
<td>NPRP 09-1140-1-177</td>
<td>Learning from comparable corpora for improved English-Arabic statistical machine translation</td>
</tr>
<tr>
<td>Brett Browning</td>
<td>NPRP 09-980-2-380</td>
<td>Robust localization and mapping for autonomous gas inspection vehicles</td>
</tr>
<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>
</tr>
<tr>
<td>Majd Sakr</td>
<td>NPRP 09-1113-1-171</td>
<td>Towards natural multi-cultural human-robot interaction</td>
</tr>
<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>
</tr>
<tr>
<td>Iliano Cervesato</td>
<td>NPRP 09-1107-1-168</td>
<td>Formal reasoning about language for distributed computation</td>
</tr>
<tr>
<td>Iliano Cervesato</td>
<td>NPRP 09-667-1-100</td>
<td>Effective programming for large distributed ensembles</td>
</tr>
<tr>
<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>
</tr>
<tr>
<td>M. Bernardine Dias</td>
<td>NPRP 4-1330-1-213</td>
<td>Cooperative robotic boats for monitoring coastal and flooded areas</td>
</tr>
<tr>
<td>Andreas Karatsolis</td>
<td>NPRP 4-1538-6-048</td>
<td>Improving professional communication skills through an online tutorial</td>
</tr>
<tr>
<td>Iliano Cervesato</td>
<td>NPRP 4-341-1-059</td>
<td>Usable automated data inference for end-users</td>
</tr>
<tr>
<td>Dudley Reynolds</td>
<td>NPRP 4-1172-5-172</td>
<td>Improving reading skills in the middle school science classroom</td>
</tr>
<tr>
<td>Majd Sakr</td>
<td>NPRP 4-1058-1-168</td>
<td>Automatic correction of Standard Arabic text: Resource and system development</td>
</tr>
<tr>
<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>
</tr>
<tr>
<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>
</tr>
<tr>
<td>Zeinab Ibrahim</td>
<td>NPRP 4-1074-5-164</td>
<td>Advancing Arabic language learning in Qatar</td>
</tr>
</tbody>
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Cycle 1
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Cycle 3
Cycle 4
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<thead>
<tr>
<th>Lead PI in Qatar</th>
<th>NPRP</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<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>
</tr>
<tr>
<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>
</tr>
<tr>
<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>
</tr>
<tr>
<td>Davide Fossati</td>
<td>NPRP 5-939-1-155</td>
<td>Intelligent learning environments for computer science undergraduate education</td>
</tr>
<tr>
<td>Divakaran Liginlal</td>
<td>NPRP 5-1393-6-044</td>
<td>Raising language effectiveness in Arabic ecommerce websites</td>
</tr>
<tr>
<td>Yonina Cooper</td>
<td>NPRP 5-1070-2-451</td>
<td>Alice for Middle East—Alice ME</td>
</tr>
<tr>
<td>Silvia Pessoa</td>
<td>NPRP 5-1320-6-040</td>
<td>Undergraduate discipline-specific writing: Expectations, demands, and development</td>
</tr>
<tr>
<td>Kemal Oflazer</td>
<td>NPRP 6-1020-1-199</td>
<td>OPTDIAC: An optimal diacritization scheme for Arabic orthographic representation</td>
</tr>
<tr>
<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>
</tr>
<tr>
<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>
</tr>
<tr>
<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>
</tr>
<tr>
<td>Mohammad Hammoud</td>
<td>NPRP 7-1330-2-483</td>
<td>Scalable analytics engine for big graphs on the cloud</td>
</tr>
<tr>
<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>
</tr>
<tr>
<td>Snezhana Abarzhi</td>
<td>NPRP 7-1785-1-321</td>
<td>Numerical and theoretical modeling of complex fluid flows</td>
</tr>
<tr>
<td>Kemal Oflazer</td>
<td>NPRP 7-290-1-047</td>
<td>MADAR: Multi-Arabic dialect applications and resources</td>
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<tr>
<td>Kemal Oflazer</td>
<td>NPRP 8-1337-1-243</td>
<td>Testing English reading comprehension through deep text analysis and question generation</td>
</tr>
<tr>
<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>
</tr>
<tr>
<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>
</tr>
<tr>
<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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<tr>
<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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<tr>
<td>Anis Charfi</td>
<td>NPRP 9-175-1-033</td>
<td>Arabic author profiling for cyber security</td>
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<tr>
<td>Ihab Younis</td>
<td>NPRP 10-0117-170178</td>
<td>Molecular profiling of breast cancer transcriptome and splicing aberrations</td>
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<tr>
<td>Annette Vincent</td>
<td>NPRP 10-0119-170197</td>
<td>Using bacteriophages as biomonitoring tools for water quality measurements</td>
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<tr>
<td>Saquib Razak</td>
<td>NPRP 10-0205-170345</td>
<td>Bringing computer science to secondary schools – Curriculum design and implementation</td>
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<tr>
<td>Gianni Di Caro</td>
<td>NPRP 10-0213-170458</td>
<td>Teams of aquatic/aerial robots for marine environmental monitoring (TARMEM)</td>
</tr>
</tbody>
</table>
Appendix 2

Publications and presentations by faculty members


John Hooker. “Sustainability around the world.” Professional workshop, Abu Dhabi, United Arab Emirates.


John Hooker. “Projection, inference, and consistency.” International Joint Conference on AI.


Zeinab Ibrahim. “Language variation, identity and planning,” In Arabe standard et variations régionales. Quelle(s) politique(s) linguistique(s) Quelle(s) didactique(s).


Zeinab Ibrahim. “Professional Arabic in action.” University of Quebec in Trois-Rivières, Canada.

Zeinab Ibrahim. “Arabiyyatiil” Roundtable, Georgetown University in Qatar.


Niraj Khare. “Patterns in combinatorial structures and Fun.” Combinatorics Seminar at Ohio State University.


Joyce Oates and Z. Peynircioğlu. “Event-based prospective memory is resistant but not immune to proactive interference.” In American Journal of Psychology.


Kemal Oflazer, R. Dekharghani, Y. Saygin, and B. Yanikoglu. “Sentiment analysis in Turkish at different granularity levels.” In Natural Language Engineering.


Appendix 2 continued

Silvia Pessoa. “How SFL and explicit language instruction can enhance the teaching of argumentation in the disciplines.” In Journal of Second Language Writing.


Silvia Pessoa, Thomas D. Mitchell, R.T. Miller, A. Johns, and M.E. Brisk. “Empowering students through explicit instruction of genres and linguistic resources.” Teachers of English to Speakers of Other Languages.

Saquib Razak, Nour Tabet, H. Gedawy, and H. Alshikhabobakr. “From Alice to Python. Introducing text-based programming in middle schools.”


Dudley Reynolds. “Helping content teachers move beyond language: Translanguaging in lesson study groups.” In M. A. Snow & D. M. Brinton (Eds.), The content-based classroom: Perspectives on integrating language and content (2nd ed.). Ann Arbor: University of Michigan Press.


Alicia M. Salaz. “Eye-tracking methodology for information literacy research” Information Literacy Network, Gulf Region Symposium.


Annette Vincent and Valentin Ilyin. “Identification and characterization of Arthrobacter sp. infecting Bacillus bacteriophage— Shumi from sand sample.” IonWorld Qatar

Annette Vincent, C. Doonan, and E. Drill. “Enhancing laboratory education with student-created videos.” Association for Biology Laboratory Education 38th Annual Meeting Houston, USA.


Appendix 3

Meeting of the Minds posters

Biological Sciences Posters
Alkaline phosphatase isozymes and their use in gastrointestinal therapy
Potential food poison analysis of phage DNA collected from Al Khor
BCL2L11 as gene target of mir-92a and mir-10a: Gene expression, interaction evaluation and implication in type 2 diabetes and obesity
Biofilm formation in water systems in Doha
Developing CRISPR mutagenesis components for *S. Cerevisiae*
Caffeine as an inhibitor of calf intestinal alkaline phosphatase
MAPK14 minor intron splicing as a novel biomarker for breast cancer
Effect of glucagon-like peptide-1 analog on modulating metabolic stress: Possible role of heat shock response
Expression, purification, and characterization of stem cell transcription factors Brn2, Sox17 and its mutant
Crystallization and characterization of HMG domain of stem cell transcription factors Sox7, Sox17 and its mutant
Effect of hydrogen peroxide at 100 μM on Calf Intestinal Alkaline Phosphatase (CIAP) enzyme kinetics
Mechanisms of breast cancer escape from Natural Killer (NK) anti-tumor immunity
Oxidative stress in kidney cells – effects of aspartame
The effects of Mg2+ and Zn2+ on human placental alkaline phosphatase (PALP) activity
Study of the role of Lactate Dehydrogenase C (LDHC) in the aggressive behavior of triple negative breast cancer
Application based learning to reinforce academic concepts in Qatar biology curriculum

Computer Science Posters
Acoustic analysis of text (AAT): Extracting sound out of words
An agile platform for distributed computation in smart IoT environments
Lifestyle disease surveillance using spatio-temporal search intensity models
PolyHJ: A polymorphic main-memory hash join paradigm for multi-core machines
Sherlock: A crowdsourced system for automated semantic tagging of indoor floorplans
The Hive: An on-edge middleware solution for context and resource sharing in the Internet of Things

Information Systems Posters
Optimizing electricity consumption in GEMTEC
To read or to listen? A study of user engagement in a digital heritage artifact
Trustmarks and trust in Qatar
Influence of culture on social media advertisements through eye-tracking
The effect of culture on image appeal and social presence in Arab e-commerce websites

Postgraduate Posters
Arabic author profiling for cyber-security
Multi-Arabic dialect lexicon extraction
About us

For more than a century, Carnegie Mellon University has challenged the curious and passionate to imagine and deliver work that matters. A private, top-ranked and global university, Carnegie Mellon sets its own course with programs that inspire creativity and collaboration.

In 2004, Carnegie Mellon and Qatar Foundation began a partnership to deliver select programs that will 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. Nearly 400 students from 35 countries call Carnegie Mellon Qatar home.

Graduates from CMU-Q are highly sought-after. Most choose careers in top organizations in Qatar and around the world, and many have pursued graduate studies. With ten graduating classes, the total number of alumni is nearly 700.

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**Facebook**: CarnegieMellonQ
**YouTube**: CarnegieMellonQatar
**LinkedIn**: Carnegie Mellon Qatar

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