

#### RESEARCH INTERESTS AND OUTCOMES

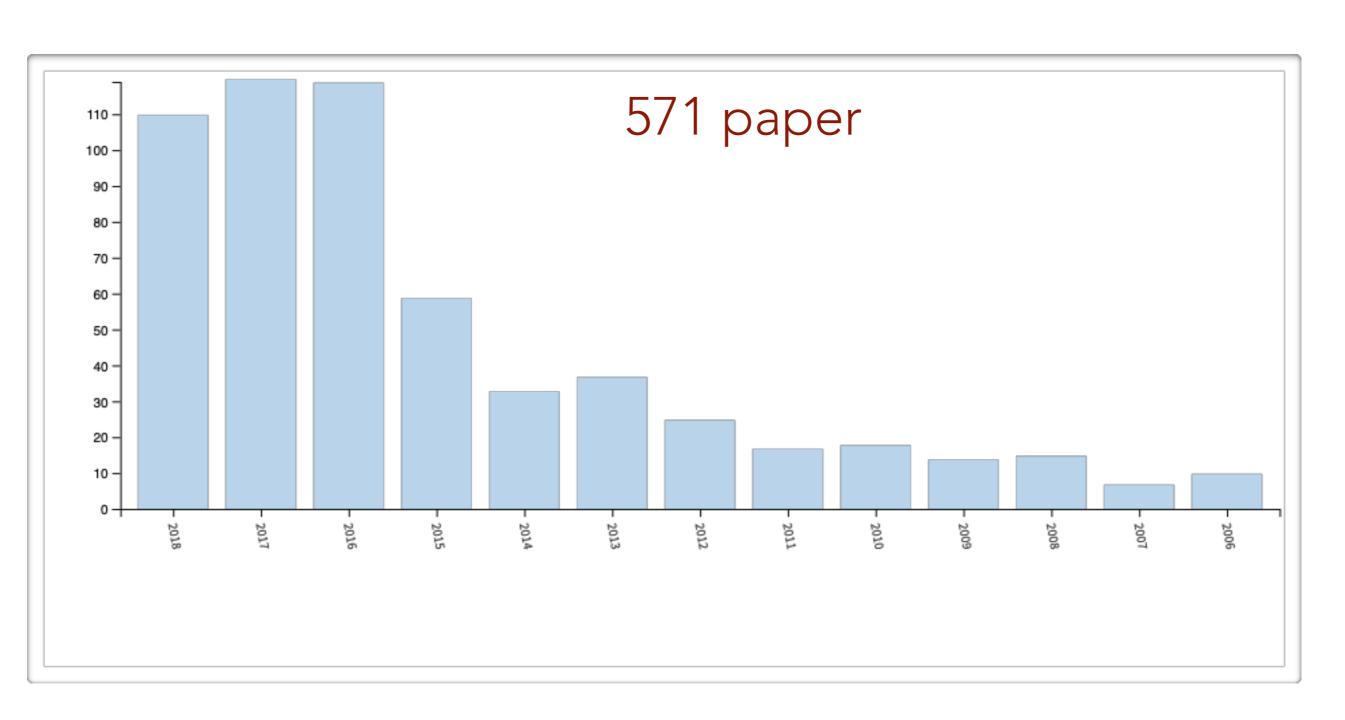
# SCHOOL OF ELECTRICAL ENGINEERING AND INFORMATION TECHNOLOGY, GJU, AMMAN, JORDAN

NETWORK MEETING, BONN-RHEIN-SIEG 8 NOVEMBER 2018, BONN-RHEIN-SIEG, GERMANY

DR RAED MESLEH, <u>RAED.MESLEH@GJU.EDU.JO</u>

# GJU ISI (WEB OF SCIENCE) PUBLICATIONS





### GJU QS RANKING



VERVIEW (/universities/german-jordanian-university)	UNDERGRADUATE (/universities/german-jordanian-university/undergrad) POSTGRADUATE (/universities/german-jordanian-university/undergrad)
	Signal Resident Standard
	German Jordanian University
	Add to Shortlist Compare
S Global World Ranking <b>⊕</b> ‡751-800	Status • Research Output • Public High

### University Highlights

2019

#751-800

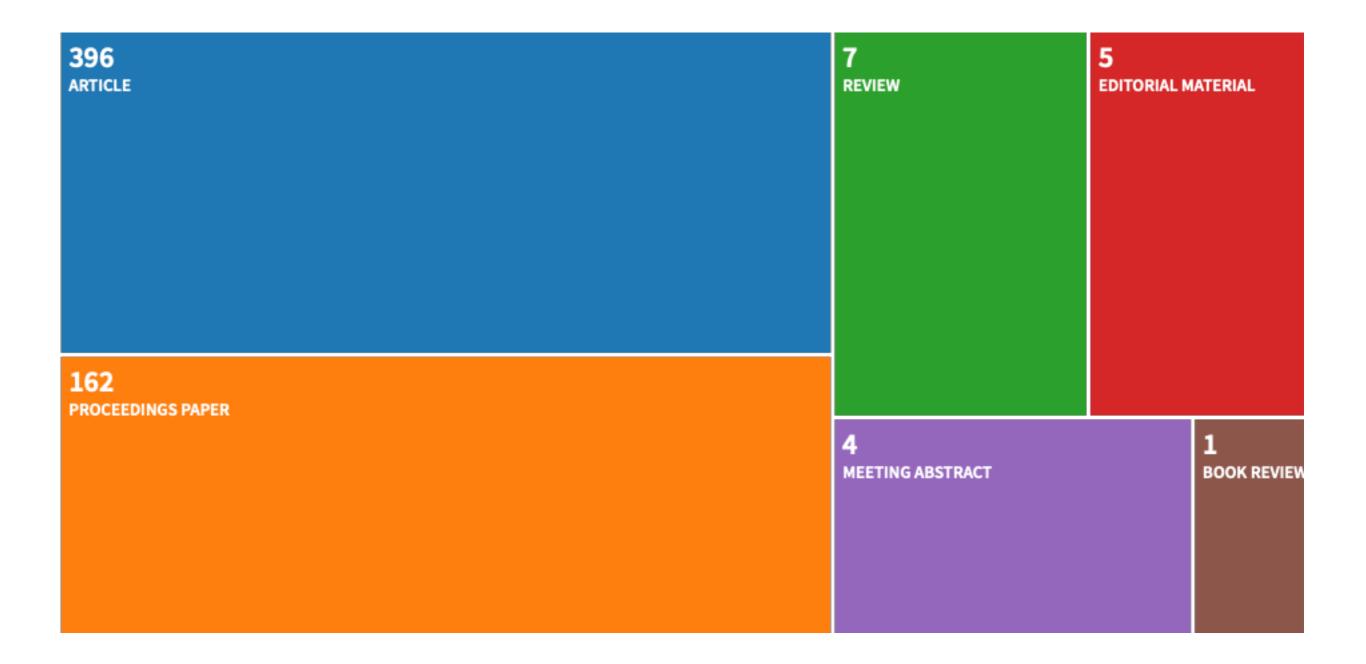
QS World University Ranking Arab Region Rankings Top 50 under 50
#751-800 #61-70 #101-150 (/qs-profiles/rank-data/nojs/295596/3412/null) data/nojs/295596/1561/null)

Chart Data

QS World University Ranking

# GJU ISI (WEB OF SCIENCE) PUBLICATIONS TYPES





# GJU ISI (WEB OF SCIENCE) FUNDING AGENCIES



23 GERMAN JORDANIAN UNIVERSITY	6 EUROPEAN UNION	4 AUSTRALIAN RESEARCH COUNCIL	4 GERMAN JORDANIAN UNIVERSITY JORDAN		K BRICK RALIA	DAAD GERMAN ACADEMIC EXCHANGE SERVICE
	6 GERMAN RESEARCH FOUNDATION DFG	<b>4</b> EC				
10 SCIENTIFIC RESEARCH SUPPORT FUND JORDAN	5 DEANSHIP OF SCIENTIFIC RESEARCH AT THE GERMAN JORDANIAN UNIVERSITY	<b>4</b> EU	DEANSHIP OF GRADUATE STUDIES AND SCIENTIFIC RESEARCH AT THE GERMAN JORDANIAN  BUTTSCHE FORSCHUNGSGEMEINSCOFF  GRADUATE STUDIES AND SCIENTIFIC RESEARCH AT THE GERMAN JORDANIAN  BUTTSCHE FORSCHUNGSGEMEINSCOFF		FOUNDATION FOR POLISH SCIENCE FNP	SCIENTIFIC RESEARCH FUNDS SRI AT MINISTRY OF HIGHER EDUCATION AMMAN JORDAN
7 VOLKSWAGEN FOUNDATION	5 NATIONAL SCIENCE FOUNDATION	4 GERMAN ACADEMIC EXCHANGE SERVICE DAAD			3 YARMOUK I	JNIVERSITY

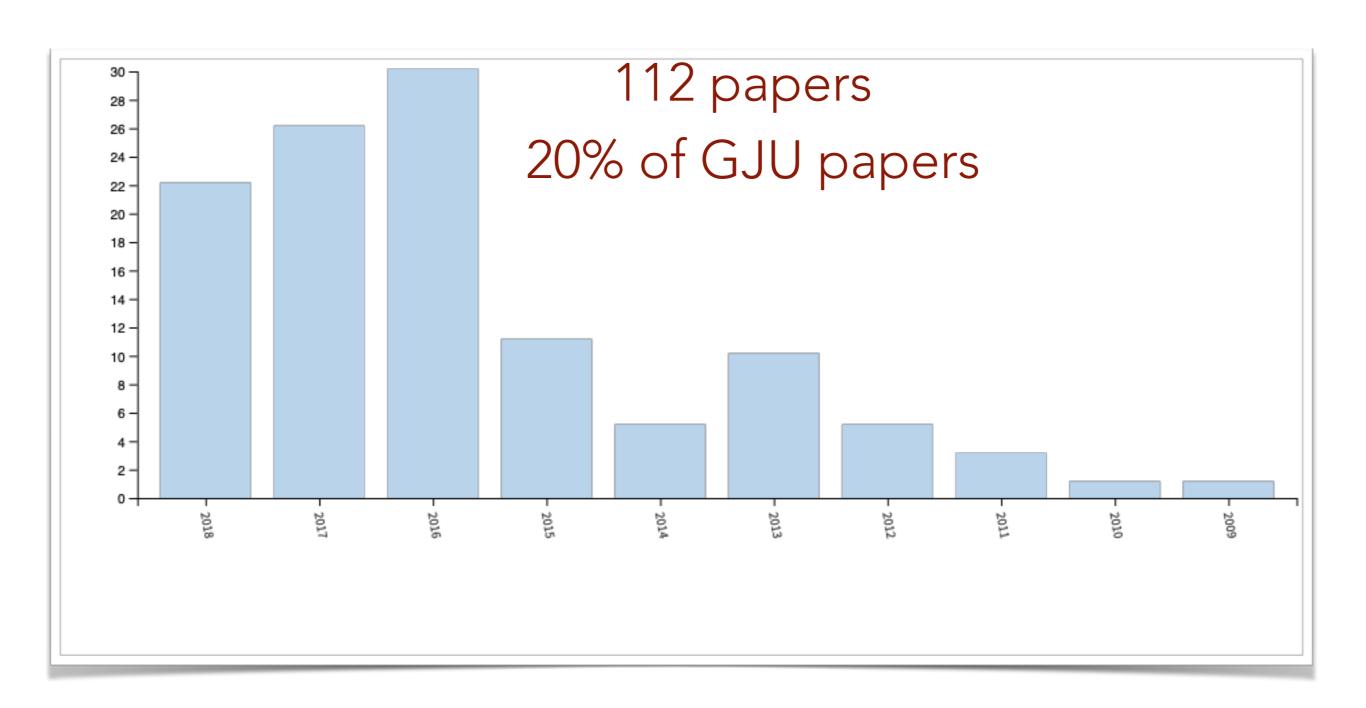
# GJU ISI (WEB OF SCIENCE) RESEARCH AREAS



237 ENGINEERING  85 COMPUTER SCIENCE	54 PHYSICS	39 MATHEMATICS  32 CHEMISTRY	26 MECHANICS	22 THERMO	22 THERMODYNAMICS	
	51 MATERIALS SCIENCE		WATER RESOURCES SY	17 AUTOMATION CONTROL SYSTEMS	13 INSTRUME INSTRUME	
	40 ENERGY FUELS	30 ENVIRONMENTAL SCIENCES ECOLOGY				
69 TELECOMMUNICATIONS	40	29 BUSINESS ECONOMICS	11 PHARMACOLOGY PHARMACY	9 ACOUST	9 TIC TRANSP	
	SCIENCE TECHNOLOGY OTHER TOPICS		10 POLYMER SCIENCE			

# SEEIT ISI (WEB OF SCIENCE) PUBLICATIONS/YEAR





# SEEIT ISI (WEB OF SCIENCE) FUNDING AGENCIES



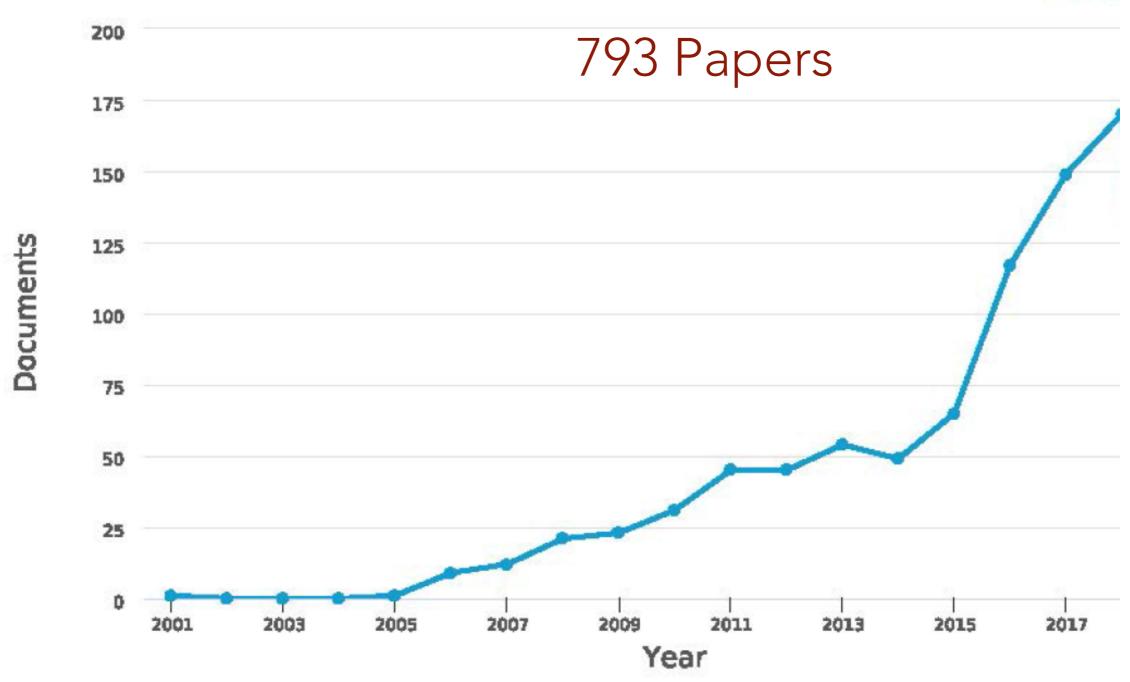
SCIENTIFIC RESEARCH SUPPORT FUND JORDAN  5 GERMAN JORDANIAN UNIVERSITY	2 ALMADAR RESEARCH AND DEVELOPMENT OFFICE  2 CANADIAN INSTITUTES OF HEALTH RESEARCH CIHR	2 NATO NORTH ATLANTIC TREATY ORGANIZATION UNDER THE SPS  2 NATURAL SCIENCES AND ENGINEERING RESEARCH COUNCIL OF CANADA	2 SEED GRANT PROGRAM AT THE GERMAN JORDANIAN UNIVERSITY		
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3 DEANSHIP OF SCIENTIFIC RESEARCH AT THE GERMAN JORDANIAN UNIVERSITY	2 EU	2  NATURAL SCIENCES AND ENGINEERING RESEARCH COUNCIL OF CANADA NSERC	1 DEANSHIP OF SCIENT RESEARCH AT GERMA JORDANIAN UNIVERS  1 DEUTSCHE FORSCHU GEMEINSCHAFT DFG	1 DEUTSCHE FORSCHUNG DFG	

# GJU SCOPUS PUBLICATIONS/YEAR



#### Documents by year





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# RESEARCH TOPIC: WIRELESS COMMUNICATION



الجامعة الألمانية الأردنية

- An US patent was filed last year
- Hardware development phase using FPGA
- Target is to implement all techniques in software defined radio (SDR)
  platform



US009954586B1

### (12) United States Patent Hiari et al.

(10) Patent No.: US 9,954,586 B1 (45) Date of Patent: Apr. 24, 2018

(54) SINGLE RF CHAIN TRANSMITTER IMPLEMENTING SPACE MODULATION

(71) Applicants: Omar Hiari, Amman (JO); Raed Mesleh, Amman (JO)

(72) Inventors: Omar Hiari, Amman (JO); Raed Mesleh, Amman (JO)

(73) Assignee: **GERMAN JORDANIAN UNIVERSITY**, Amman (JO)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35

U.S.C. 154(b) by 0 days.

(21) Appl. No.: **15/632,151** 

(22) Filed: Jun. 23, 2017

2016/0126627 A1 5/2016 Lee et al.

2016/0352362 A1\* 12/2016 Fonseka ...... H03M 13/2906

#### OTHER PUBLICATIONS

Mesleh et al., "Spatial Modulation", IEEE Transactions on Vehicular Technology, vol. 57, No. 4 (2008), pp. 2228-2241.

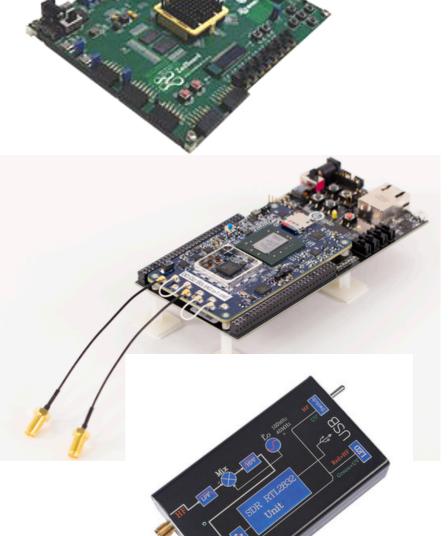
Jeganathan et al., "Keying Modulation for MIMO Channels", IEEE Transactions on Wireless Communications, vol. 8, No. 7 (2009), pp. 3692-3703.

Barousis et al., "A Complete MIMO System Built on a Single RF Communication Ends", PIERS Online, vol. 6, No. 6 (2010), pp. 559-563.

#### (Continued)

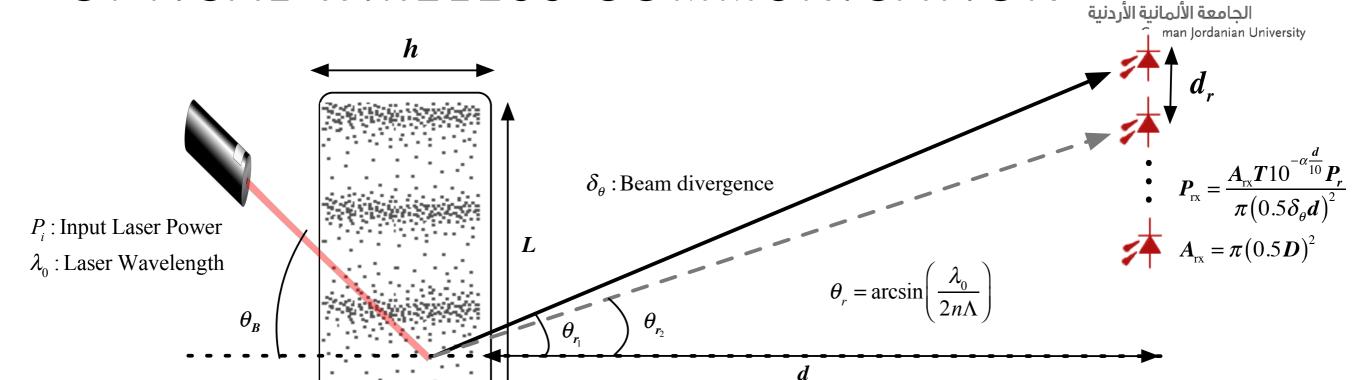
Primary Examiner — Janice Tieu

(74) Attorney, Agent, or Firm — Richard C. Ltman



# RESEARCH TOPIC: OPTICAL WIRELESS COMMUNICATION





 $\Lambda = \frac{v_s}{f_s}$ : Sound wavelength

 $v_s$ : Acoustic velocity

 $f_s$ : Acoustic frequency

 $I_s$ : Acoustic intensity  $(W/m^2)$ 

Acoustic Transducer  $P_r = 2\pi^2 n^2 \frac{L^2 \Lambda^2}{\lambda_0^4} M_i I_s P_i$ 

L:Length of acoustic

 $M_i$ : Material Parameter  $(m^2/W)$ 

*n*: Refractive index

$$f_s \alpha f_{RF}$$

$$I_s = \frac{1}{Lh} P_{RF}$$



Serial Bits -

**RF Signal** 

### RESEARCH FUNDING



- "Hardware Implementations Reliability Analysis of Space Modulation Techniques", Abdul Hameed Shoman Foundation, October 2018— September 2019, 15,000.00 JDs.
- "Acousto Optical Modulator for free Space Optical Communication", Funded by Scientific Research Funding (SRF), Ministry of Higher Education, Amman, Jordan 8 June 2017—8 June 2019, 52,630.00 JDs.
- "Implementation of Index Modulation Transmitters for IoT Wireless Applications", Funded by Deanship of Scientific Research, German Jordanian University, January 2017—January 2019, 54,400.00 JDs
- "Single RF Chain MIMO Index Modulation Techniques", Funded by Deanship of Scientific Research, German Jordanian University, January 2017—January 2018, 18,660.00 JDs.

### RESEARCH TOPIC: HUMAN-CENTERED COMPUTING



- Human-centered computing (HCC)
- Brain-computer interfaces (BCIs)
- Non-verbal human-behavior analysis (HBA)





Trigno EMG









# RESEARCH TOPIC: WIRELESS SENSOR NETWORKS



- Wireless Sensor Networks and remote sensing for military application
- Project title: Hybrid sensor networks for emergency critical scenarios Supporting authority: NATO Countries Role: NATO partner director Grant amount: 400,000 Euro Duration: Sep 2015-Sep 2018.



### SUMMARY



- GJU is a relatively new university
- GJU has major focus on applied research and invest hugely in research projects
- The school of EEIT promises substantial and multidisciplinary research platform
- The achievements of the SEEIT in the past few years were very substantial and opens global and local research collaboration
- The school is always searching for new research partners and projects

