

Research in Information Security

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Welcome to Research in Information Security

Why Research?

- **“If we knew what it was we were doing, it would not be called research, would it?” – Albert Einstein**
- **“If I had an hour to solve a problem I’d spend 55 minutes thinking about the problem and 5 minutes thinking about solutions.” – Albert Einstein**
- **“Successful people are not gifted; they just work hard, then succeed on purpose.” – G. K. Nielson**
- **“The three great essentials to achieve anything worthwhile are, first, hard work; second, stick-to-itiveness; third, common sense.” – Thomas A. Edison**

What is Research?

- Research means to carefully analyze the problems or to do the detailed study of the specific problems, by making use of special scientific methods.
- Research can be done on any topic, be it medical, non- medical, Information Technology (IT), or anything else.
- In order to do research, first of all, you need to have a topic or the problem on which you can do research. The topic must have relevant questions to answer.
(**Formulation of Problem Statement**)
- For research, certain steps have to be followed like first observation, then background research then preparing of hypothesis, eventually conducting a simple experiment.
(**Finding Solutions to the Defined Problems**)

- Working on a research project will obviously be a challenging and rewarding experience, provided you put the best of your expertise and skill in it.
- It is an opportunity which helps you to pursue an in-depth or deep original study about any topic which interests you.
- The main aim of the goals is to provide the best of the solution to some of the world problems and also to enhance our knowledge.

Research Paper Structure

Sections	What to do?
Abstract	Write 150 words on the purpose of the study, research questions or suggestions, and main findings with conclusions.
Outline	Organize the map of the study.
Introduction	Provide the main information on the problem statement, the indication of methodology, important findings, and principal conclusion.
Literature Review	Analyze and incorporate scholarly sources on past studies.
Methodology or Materials and Methods	Explain the design of the research with techniques that are used for gathering information and other aspects related to the experiment.
Results	Present and illustrate the obtained findings.
Discussion	Review the information in the introduction part, evaluate their gained results, or compare it with past studies.
Recommendations	Propose potential solutions or new ideas based on the obtained results.
Limitations	Consider the weaknesses of the research and results to get new directions.
Conclusion	Provide final thoughts and the summary of the whole work.
Acknowledgments or Appendix	Include additional information on the research paper if it is necessary.
References	Provide and cite all used sources in the study.

How to Measure Impact of Research?

- The **Science Citation Index (SCI)** is a citation index originally produced by the Institute for Scientific Information and created by Eugene Garfield. It was officially launched in 1964. It is now owned by Clarivate Analytics.
- **Impact Factor:** The impact factor (IF) is a measure of the frequency in which the average article in a journal is cited in a particular year. Impact factors measure the impact of a journal, not the impact of individual articles.
- The **h-index** is an index to quantify an individual's scientific research output. The h-index is an index that attempts to measure both the scientific productivity and the apparent scientific impact of a scientist. The index is based on the set of the researcher's most cited papers and the number of citations that they have received in other people's publications. **h-index is the largest number h such that h publications have at least h citations.**
- The **i10-index** is the number of publications with at least 10 citations.

How to Measure Impact of Research? (About me)

Research Contributions (Total publications: 314)

- **Number of Journal Papers (Published/Accepted): 271**
- **Number of Conference Papers (Published): 32**
- **Number of Book Chapters: 9**
- **Number of Edited Books: 2**
- **Total citations: 13,125, h-index: 67, i10-index: 195** (According to Google Scholar Citations as on July 27, 2022)
- **Number of IEEE Transactions/Journal/Magazine Papers: 105**
- **Published in top venues like**
 - * IEEE Transactions on Information Forensics and Security
 - * IEEE Transactions on Dependable and Secure Computing
 - * IEEE Transactions on Consumer Electronics
 - * IEEE Transactions on Smart Grid
 - * IEEE Transactions on Industrial Informatics
 - * IEEE Transactions on Vehicular Technology
 - * IEEE Internet of Things Journal
 - * IEEE Systems Journal
 - * IEEE Consumer Electronics Magazine
 - * IEEE Communications Magazine
 - * IEEE Journal of Biomedical and Health Informatics
 - * IEEE Transactions on Network Science and Engineering
 - * IEEE Transactions on Intelligent Transportation Systems

- **Member of the Editorial Board of the following journals**
 - ▶ Associate Editor: **IEEE Systems Journal**
 - ▶ Editor: **Journal of Network and Computer Applications (Elsevier)**
 - ▶ Editor: **Computer Communications (Elsevier)**
 - ▶ Associate Editor: **IET Communications**
 - ▶ Associate Editor: **Journal of Cloud Computing (Springer)**
 - ▶ Editor: **Cyber Security and Applications (Elsevier)**
 - ▶ Editor: **KSII Transactions on Internet and Information Systems**
 - ▶ Editor: **International Journal of Internet Technology and Secured Transactions (Inderscience)**
- **Program Committee Chair(s) of International Congress on Blockchain and Applications (BLOCKCHAIN'19), Avila (Spain), June 2019 and Blockchain 2020, Italy, October 2020**
- **Program Committee Member for several international conferences**
- **Reviewer for several journals including IEEE Transactions, ACM Transactions, Elsevier, etc. IEEE Communications Surveys and Tutorials, IEEE Transactions on Emerging Topics in Computing, IEEE Transactions on Information Forensics and Security, IEEE Transactions on Industrial Electronics, IEEE Journal of Biomedical and Health Informatics, IEEE Transactions on Smart Grid, IEEE Systems Journal, IEEE Communications Magazine, ACM Computing Surveys, IEEE Transactions on Cloud Computing, IEEE Internet of Things Journal, IEEE Transactions on Services Computing, IEEE Transactions on Network Science and Engineering, IEEE Transactions on Cybernetics, IEEE Transactions on Industrial Informatics, ACM Transactions on Privacy and Security, ACM Transactions on Cyber-Physical Systems, IEEE Wireless Communications Magazine . . .**

How to Measure Impact of Research?

- **DBLP:** <https://dblp.org/pid/39/871.html>
- **Google Scholar:** <https://scholar.google.com/citations?user=bToAUHMMAAAAJ&hl=en>
- **Top Computer Science Scientists in the World by Research.com:**
<https://research.com/scientists-rankings/computer-science/in>
The Guide2Research website lists only scientists having H-Index ≥ 40 and indexed DBLP papers ≥ 40 within the area of Computer Science and Electronics.
- Included in the subject-wise ranking of **top 2% scientists from India (all fields) in the area of Networking & Telecommunications, with high Rank world-wide (by subject area).**
- My recent media coverage on “China way ahead in blockchain, India needs to catch up” in **the Times of India newspaper** on 6 May 2021 (please see at: <https://timesofindia.indiatimes.com/business/india-business/china-way-ahead-in-blockchain-india-needs-to-catch-up/articleshow/82428430.cms>)

My International Research Collaborations

- **Mauro Conti**, Head of SPRITZ Security and Privacy Research Group, Director of UniPD node of CINI Cybersecurity National Lab, EU Marie Curie Fellow Alumni, CEO and co-funder of CHISITO, and Co-funder of DYALOGHI, University of Padua, Italy
- **Willy Susilo**, IEEE Fellow, ARC Future Fellow, Co-Director, Centre for Computer and Information Security Research, University of Wollongong, Australia
- **Sherali Zeadally**, Fellow of the British Computer Society and the Institution of Engineering Technology, Stevenage, U.K., University of Kentucky, Lexington, KY 405 06 USA
- **Kim-Kwang Raymond Choo**, Fellow, Australian Computer Society, Department of Information Systems and Cyber Security, The University of Texas at San Antonio, San Antonio, TX 78249 USA
- **Xinyi Huang**, Fujian Provincial Key Laboratory of Network Security and Cryptology, Fujian Normal University, Fuzhou, Fujian, China
- **Alexey Vinel**, Halmstad University, Halmstad, Sweden
- **Muhammad Khurram Khan**, FIET (UK), FBCS (UK), Center of Excellence in Information Assurance, King Saud University, Riyadh, Saudi Arabia
- **Dusit (Tao) Niyato**, IEEE Fellow, School of Computer Science and Engineering (SCSE), Nanyang Technological University

My International Research Collaborations

- **Athanasios V. Vasilakos**, Lulea University of Technology, Sweden
- **Minho Jo**, Department of Computer and Information Science, Korea University, Seoul, South Korea
- **Laurence T. Yang**, St. Francis Xavier University, Canada
- **Joel J. P. C. Rodrigues**, IEEE Fellow, National Institute of Telecommunications - Inatel, Brazil
- **Debiao He**, School of Cyber Science and Engineering, Wuhan University, Wuhan 430 072, China
- **Jong-Hyouk Lee**, Sangmyung University, Republic of Korea
- **Pascal Lorenz**, University of Haute Alsace, France
- **Qi Jiang**, Xidian University, China
- **Eun-Jun Yoon**, Kyungil University, Gyeonbuk, Korea
- **Xiong Li**, Hunan University of Science and Technology, China
- **YoungHo Park**, School of Electronics Engineering, Kyungpook National University, South Korea
- **Mohammad S. Obaidat**, IEEE Life Fellow, University of Sharjah, UAE
- **Sachin Shetty**, Old Dominion University, USA

- **QS World University Rankings 2022 — Top Universities**
- `https://www.topuniversities.com/university-rankings/world-university-rankings/2022`

- **Why IIT is not counted in the top 200 institutes in the world?**

<https://www.youtube.com/watch?v=3k70mKrXlyU>

- **Official explains why IITs are not on list of world's top 200 universities**

https://www.youtube.com/watch?v=RQu5E2_OzU0

- **V Ramgopal Rao, Director of IIT Delhi on how IITs can break into the top 100 in world rankings**

<https://www.youtube.com/watch?v=xrELBLTAKxI>

- Elliptic-Curve Cryptography (ECC) and Digital Signatures
- Key management in hierarchical access control
- Key management, user authentication and access control in wireless sensor networks/IoT
- Proxy signature
- Security in vehicular ad hoc networks/Internet of Vehicles (IoV)
- Security in smart grid
- Security in Cloud/Fog Computing
- Intrusion detection
- Blockchain and Its Security and Privacy Issues
- AI/ML Security

- Research papers
 - ▶ IEEE Transactions
 - ▶ ACM Transactions
 - ▶ Elsevier
 - ▶ Springer
 - ▶ Wiley

Grading Method:: Relative

- Mid Sem: 25% (Closed books and notes exam)
- End Sem: 45% (Closed books and notes exam)
- Term Project: 30% (including report and presentation)

Thank You!!!