Message from the General Chair

On behalf of the ASONAM 2009 Conference Committee I would like to extend an invitation to journey through the latest research on social network analysis and mining as it is presented through the papers in this collection. Browsing through the wide area of topics the presenters of ASONAM 2009 covered I found myself recalling one of my favorite childhood games – Connect the Dots. I remember that most of the time I could pretty much figure out the shape that would be revealed after connecting the numbered dots by just looking at their distribution and intensity since they would always trace the perimeter of the hidden object or face.

Some times though a real challenge would show up where I couldn’t quite tell what the underlined figure was. That would be the thrill of the moment. Here, I would say people are trained by virtue to construct and analyze social networks. While connecting dots over 30 years ago, I was not aware of the research efforts to establish the methodology and theory of social networks. My involvement in social networks research started again to give me a different kind of thrill. This time it wasn’t as much the revealing of the “secret” pattern as much as it was the way the different dots will dictate the pattern. We use terms like centrality, degree, betweenness and clustering coefficient among others to talk to each other about what the underlying figure shows. Sometimes the figure seems out of focus but sometimes a clear pattern emerges that makes absolute sense. Such a discovery could, in a sense, actually make a difference in the lives of people.

Maturity comes with age and exposure. From one side, I believe that the field of social networks is still in its fancy though has now shown both and the current volume of research that this publication represents is a testimony of its achievements. We say it is in its fancy by considering the emerging applications and the recent growing interest in social networks. Social Networking, like every field of science has done before, we now have clear objectives, established techniques that produce results that benefit society and advance knowledge and a growing of scientists and practitioners to support and ensure its ongoing development. I believe that ASONAM 2009 is a major contribution to the advancement of social network analysis and mining and I hope that our readers will both learn from and enjoy the research presented as much as the participating authors.

I would like to express my sincere gratitude to the Conference Committee for their time, dedication and diligence over the past year in delivering an exciting and rewarding scientific conference. We look forward to meeting again next year in Denmark for ASONAM 2010.

Best regards,
Nicholas Harkiolakis, PhD
General Chair, ASONAM 2009
Preface

The study of social networks originated in social and business communities. The area has been recently influenced by the advanced computing techniques that allow researchers to tackle scalability issues. As a result, social network research has advanced significantly; the development of sophisticated techniques for social network analysis and mining has been highly influenced by the online social websites, email logs, phone logs and instant messaging systems, which are widely analyzed using graph theory and machine learning techniques. People perceive the web increasingly as a social medium that fosters interaction among people, sharing of experiences and knowledge, group activities, community formation and evolution. This can be seen as rising prominence of social network analysis and mining in academia, politics, homeland security and business. Many entities of our society evolved into networks in which actors are increasingly dependent on their structural embedding. All these developments and the rising interest in social network analysis and mining motivated us to start this new conference. It was a challenging task to put all these disciplines under one umbrella and we succeeded in forming a strong international program committee. Organizers of ASONAM 2009 together with program committee members worked extremely hard as evident by the strong papers that have been selected to appear in this proceedings.

ASONAM 2009 is intended to address important aspects of interest to practitioners and researchers with a specific focus on the emerging trends and industry needs associated with social networking analysis and mining. The conference solicits experimental and theoretical work on social network analysis and mining, including: (1) using graph theory and machine learning approaches or multi-agent based simulation for social network modeling, constructing scalable, customizable social network infrastructure, as well as the identification and discovery of dynamic growth and evolution patterns; (2) data mining advances on the discovery and analysis of communities, on personalization for solitary activities (like search) and social activities (like discovery of potential friends), on the analysis of user behavior in open fora (like conventional sites, blogs and fora) and in commercial platforms (like e-auctions) and on the associated security and privacy-preservation challenges.

ASONAM 2009 provides an interdisciplinary venue that sets the stage for sociologists, behavioral scientists, computer scientists, psychologists, anthropologists, and information systems scientists to exchange ideas, learn new concepts, and develop new methodologies. Activities included speeches from keynote speakers, oral and poster presentations. The main goal of ASONAM 2009 is to study and elaborate synergies between interdisciplinary venues as discussed above, and to provide a glimpse at the state of the art in the area. This year also one International Workshop on Mining Social Networks for Decision Support is organized. We have received a large number of high quality submissions, got them extensively reviewed by experts and accepted only a small percentage (less than 30%) of them.

We are grateful for the dedicated work of both authors and program committee members who contributed their time to ensure the good quality of the technical program. The organization of this event was made possible through the support of the Hellenic American University Athens, University of Calgary, Aalborg University and University of Southern Denmark.

More than 70 researchers will share a chapter of their efforts with their fellow researchers. Together, the manuscripts collected here reflect the evolving state of social network analysis and mining and bringing researchers from more than 25 countries around the globe has allowed us to address the scope of this field from very wide perspective. Each contributor this conference does indeed add fresh views and thoughts, challenges our beliefs, and encourages further exploration and innovation on our part. We are grateful to each one of you for providing the opportunity to share your invaluable work with us.

With the hope that this conference will open even wider awareness of knowledge, we welcome you to the HAU campus in Athens to enjoy the wonderful program of ASONAM 2009 and encourage you to start working on your submission to ASONAM 2010 which will be hosted by University of Southern Denmark. We look forward to meeting you again in Odense for ASONAM 2010.

Nasrullah Memon and Reda Alhajj
Program Chairs/Editors
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We are deeply indebted to all the contributors to this conference, all the members of the program committee and external reviewers for their patience and cogent views of papers, who help us and Social Network Mining community with their expertise and feedbacks to shape this event effectively.

Our special thanks go to all program and organizing committee members who go out of their way to help in shaping ASONAM 2009.

We would like to extend our sincere thanks to our keynote speakers: Professor Dr. Hsinchun Chen, University of Arizona, Professor Dr. Christos Faloutsos, Carnegie Mellon University and Professor Dr. Panos Pardalos, University of Florida.

Finally, we would offer our sincere thanks to ACM, SIGCHI, SIGKDD, SIGWEB, SIGSPATIAL, IEEE Computer Society, TCDE, and Danish Center for Risk Research (DaCoRR) for supporting ASONAM 2009. Our appreciations are also due to Bob Werner (and his team) Production Editor from Conference Publishing Services (CPS) of IEEE Computer Society for their high standard editorial production of the Proceedings.
Keynote
Homeland Security Data Mining using Social (Dark) Network Analysis

Hsinchun Chen
University of Arizona

ABSTRACT
The tragic events of September 11th have caused drastic effects on many aspects of society. Academics in the fields of computational and information science have been called upon to help enhance the government’s ability to fight terrorism and other crimes. Keeping in mind the special characteristics of crimes and security-related data, data mining techniques can contribute in six areas of research: information sharing and collaboration, security association mining, classification and clustering, intelligence text mining, spatial and temporal crime pattern mining, and criminal/terrorist network analysis. Grounded on social network analysis (SNA) research, criminal network analysis and terrorist network analysis have been shown to be most promising for public safety and homeland security. Based on the University of Arizona’s highly successful COPLINK and Dark Web projects, we will discuss relevant SNA for “dark networks” (criminal and terrorist networks). Selected techniques, examples, and case studies will be presented based on gang/narcotic networks, US extremist networks, Al Qaeda member networks, and international Jihadist web site and forum networks. Unique homeland security challenges and future directions will also be presented.

BIOGRAPHICAL NOTE
Dr. Hsinchun Chen is McClelland Professor of Management Information Systems at the University of Arizona and Andersen Consulting Professor of the Year (1999). He received the B.S. degree from the National Chiao-Tung University in Taiwan, the MBA degree from SUNY Buffalo, and the Ph.D. degree in Information Systems from the New York University. Dr. Chen is a Fellow of IEEE and AAAS. He received the IEEE Computer Society 2006 Technical Achievement Award. He is author/editor of 13 books, 17 book chapters, and more than 130 SCI journal articles covering digital library, intelligence analysis, biomedical informatics, data/text/web mining, knowledge management, and Web computing. His recent books include: Medical Informatics: Knowledge Management and Data Mining in Biomedicine and Intelligence and Security Informatics for International Security: Information Sharing and Data Mining, both published by Springer. Dr. Chen was ranked #8 in publication productivity in Information Systems (CAIS 2005) and #1 in Digital Library research (IP&M 2005) in two recent bibliometric studies. He serves on ten editorial boards including: ACM Transactions on Information Systems, ACM Journal on Educational Resources in Computing, IEEE Transactions on Intelligent Transportation Systems, IEEE Transactions on Systems, Man, and Cybernetics, Journal of the American Society for Information Science and Technology, Decision Support Systems, and International Journal on Digital Library. Dr. Chen has served as a Scientific Counselor/Advisor of the National Library of Medicine (USA), Academia Sinica (Taiwan), and National Library of China (China).

He has been an advisor for major NSF, DOJ, NLM, DOD, DHS, and other international research programs in digital library, digital government, medical informatics, and national security research. Dr. Chen is founding director of Artificial Intelligence Lab and Hoffman E-Commerce Lab. The UA Artificial Intelligence Lab, which houses 40+ researchers, has received more than $20M in research funding from NSF, NIH, NLM, DOD, DOJ, CIA, DHS, and other agencies over the past 17 years. The Hoffman E-Commerce Lab, which has been funded mostly by major IT industry partners, features one of the most advanced e-commerce hardware and software environments in the College of Management.

Dr. Chen is conference co-chair of ACM/IEEE Joint Conference on Digital Libraries (JCDL) 2004 and has served as the conference/program co-chair for the past eight International Conferences of Asian Digital Libraries (ICADL), the premiere digital library meeting in Asia that he helped develop. Dr. Chen is also (founding) conference co-chair of the IEEE International Conferences on Intelligence and Security Informatics (ISI) 2003-2007. The ISI conference, which has been sponsored by NSF, CIA, DHS, and NIJ, has become the premiere meeting for international and homeland security IT research.

Dr. Chen’s COPLINK system, which has been quoted as a national model for public safety information sharing and analysis, has been adopted in more than 200 law enforcement and intelligence agencies in 20 states. The COPLINK research had been featured in the New York Times, Newsweek, Los Angeles Times, Washington Post, Boston Globe, and ABC News, among others. The COPLINK project was selected as a finalist by the prestigious International Association of Chiefs of Police (IACP)/Motorola 2003 Weaver Seavey Award for Quality in Law Enforcement in 2003. COPLINK research has recently been expanded to border protection (BorderSafe), disease and bioagent surveillance (BioPortal), and terrorism informatics research (Dark Web).
funded by NSF, CIA, and DHS. In collaboration with Customs and Border Protection (CBP), the BorderSafe project develops criminal network analysis and vehicle association mining research for border-crosser risk assessment. The BioPortal system supports interactive geospatial analysis and visualization, chief complaint classification, and phylogenetic analysis for public health and biodefense.

In collaboration with selected international terrorism research centers and intelligence agencies, the Dark Web project has generated one of the largest databases in the world about extremist/terrorist-generated Internet contents (web sites, forums, and multimedia documents). Dark Web research supports link analysis, content analysis, web metrics analysis, multimedia analysis, sentiment analysis, and authorship analysis of international terrorism contents. The project was featured in the Discover magazine, Arizona Republic, and Toronto Star, among others.

Dr. Chen is the founder of the Knowledge Computing Corporation, a university spin-off company and a market leader in law enforcement and intelligence information sharing and data mining. Dr. Chen has also received numerous awards in information technology and knowledge management education and research including: AT&T Foundation Award, SAP Award, the Andersen Consulting Professor of the Year Award, the University of Arizona Technology Innovation Award, and the National Chaio-Tung University Distinguished Alumnus Award.
Keynote
A Retrospective Review of Social Networks

Panos M. Pardalos
University of Florida

ABSTRACT

Social network analysis deals with the interactions between individuals by considering them as nodes of a network (graph) whereas their relations are mapped as network edges. Study of such structures lies on the intersection of two different areas of research: sociology and graph theory. In this paper we give an overview of the mathematical concepts used for studying these networks as well as the major methodologies employed for the study of them. Most prominent applications and research trends of the field are also discussed.

(Joint work with Petros Xanthopoulos1, Ashwin Arulselvan1, and Vladimir Boginski2.)

BIOGRAPHICAL NOTE

Dr. Panos Pardalos is Distinguished Professor of Industrial and Systems Engineering at the University of Florida. He is also affiliated faculty member of the Computer Science Department, the Hellenic Studies Center, and the Biomedical Engineering Program. He is also the director of the Center for Applied Optimization.

Dr. Pardalos obtained a PhD degree from the University of Minnesota in Computer and Information Sciences. He has held visiting appointments at Princeton University, DIMACS Center, Institute of Mathematics and Applications, FIELDS Institute, AT&T Labs Research, Trier University, Linkoping Institute of Technology, and Universities in Greece.

He has received numerous awards including, University of Florida Research Foundation Professor, UF Doctoral Dissertation Advisor/Mentoring Award, Foreign Member of the Royal Academy of Doctors (Spain), Foreign Member Lithuanian Academy of Sciences, Foreign Member of the Ukrainian Academy of Sciences, Foreign Member of the Petrovskaya Academy of Sciences and Arts (Russia), and Honorary Member of the Mongolian Academy of Sciences.

Dr. Pardalos received the degrees of Honorary Doctor from Lobachevski University (Russia) and the V.M. Glushkov Institute of Cybernetics (Ukraine), he is a fellow of AAAS, a fellow of INFORMS, and in 2001 he was awarded the Greek National Award and Gold Medal for Operations Research.

Dr. Pardalos is a world leading expert in global and combinatorial optimization. He is the editor-in-chief of the Journal of Global Optimization, Journal of Optimization Letters, and Computational Management Science. In addition, he is the managing editor of several book series, and a member of the editorial board of several international journals. He is the author of 8 books and the editor of several books. He has written numerous articles and developed several well known software packages. His research is supported by National Science Foundation and other government organizations. His recent research interests include network design problems, optimization in telecommunications, e-commerce, data mining, biomedical applications, and massive computing.

Dr. Pardalos has been an invited lecturer at many universities and research institutes around the world. He has also organized several international conferences.

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Keynote
Graph Mining: Patterns, Generators and Tools

Christos Faloutsos
CMU

ABSTRACT
How do graphs look like? How do they evolve over time? How can we generate realistic-looking graphs? We review some static and temporal “laws”, and we describe the “Kronecker” graph generator, which naturally matches all of the known properties of real graphs. Moreover, we present tools for discovering anomalies and patterns in two types of graphs, static and time-evolving. For the former, we present the “CenterPiece” subgraphs (CePS), which expects \( q \) query nodes (e.g., suspicious people) and finds the node that is best connected to all \( q \) of them (e.g., the master mind of a criminal group). We also show how to compute CenterPiece subgraphs efficiently. For the time evolving graphs, we present tensor-based methods, and apply them on real data, like the DBLP author-paper dataset, where they are able to find natural research communities, and track their evolution. Finally, we also briefly mention some results on influence and virus propagation on real graphs, as well as on the emerging map/reduce approach and its impact on large graph mining.

BIOGRAPHICAL NOTE
Christos Faloutsos is a Professor at Carnegie Mellon University. He has received the Presidential Young Investigator Award by the National Science Foundation (1989), the Research Contributions Award in ICDM 2006, twelve “best paper” awards, and several teaching awards. He has served as a member of the executive committee of SIGKDD; he has published over 160 refereed articles, 11 book chapters and one monograph. He holds five patents and he has given over 20 tutorials and over 10 invited distinguished lectures. His research interests include data mining for streams and networks, fractals, indexing for multimedia and bio-informatics data, and database performance.