CURRICULUM VITAE

Name: Xiaofei Zhang Department:Computer Science

EDUCATION

DEGREES	DISCIPLINE	INSTITUTION	YEAR
PhD	Computer Science and Engineering	The Hong Kong University of Science and Technology	2013
Master	Cmoputer System and Architecture	The University of Science and Technology Beijing	2009
Bachelor	Computer Science and Technology	The University of Science and Technology Beijing	2006

EXPERIENCE

RANK/POSITION	DEPARTMENT/DIVISION	INSTITUTION/COMPANY/ORGANIZATION	PERIOD
Assistant Professor	Dept. of Computer Science	The University of Memphis	2018 -
			Present
Postdoctoral Research	Cheriton School of Computer Science	The University of Waterloo	2015 -
Fellow			2018
Postdoctoral Research	Dept. of Computer Science and	The Hong Kong University of Science and	2014 -
Fellow	Engineering	Technology	2015
Postdoctoral Research	Dept. of Systems Engineering and	The Chinese University of Hong Kong	2013 -
Fellow	Engineering Management		2014

HONORS/AWARDS

HONOR/AWARD	INSTITUTION/COMPANY/ORGANIZATION	YEAR
Faculty Service Award	Dept. of Computer Science, University of Memphis	2021

TEACHING EXPERIENCE

SUBJECT	INSTITUTION
COMP7/8118-M50 Data Mining, S2020 (new preparation), F2020, S/F2021, S/F2022	The University of Memphis
COMP 7/8118 Data Mining, F2019 (new preparation), S2023	The University of Memphis
COMP7/8116 Advanced Database Systems, F2021 (new preparation), F2022, S2023	The University of Memphis
COMP7/8991 Big Data Computing, S2019 (new Preparation)	The University of Memphis
COMP4/6118 Introduction to Data Mining, S2019 (new Preparation), S2022	The University of Memphis
CS348 Introduction to Database Systems, F2016, W2018	The University of Waterloo

STUDENT ADVISING/MENTORING

CURRENT DEGREE	NAME	YEAR OF GRADUATION
Ph.D. (Current)	Manish Joseph Kasu; Jun Huang; Ryan Petrick Wickman; Muyang Fan	2025; 2025; 2024;
		2027 (all expected)
Master (Current,	Siva Reddy Devarakonda; Sairam Kota; Venkata Naga Sai Krishna Gupta Kothuri;	2025; 2025; 2025;
Academic	Mahesh Rachanna	2025 (all expected)
Advisor)		
Master (Advised	Balaga Sabarinath; Gunda Nikhil; Kandadi Rateep Kumar (transfered to DS); Katta	N/A
in summer/fall	Narendar Reddy; Subraveti Reddy Shanmukha; Shashank Subraveti; NItish Kumar	
2022)	Manthri; Meeravali Kocherla; Riddhi Mohit Makwana; Saiprakash Kandula; Pujitha	
	Inaganti; Lokesh Kancharla; Pooja Kamshetty; Sainath Reddy Addula; Hemanth	
	Venumbaka; Veeharika Reddy Revoori; Srinivas Hapnoor; Poojitha Tanikonda; Priyanka	
	Yerra	
Master	Nikhil Pandas; Manaswitha Revuri	2023
(Graduated)		
Master	Thi Phan; Pavan Kurakula; Jun Huang	2022
(Graduated)		

Master (Creducted)	Yumi Kansakar; Monali Vipulkumar Trivedi; Ahuti Shrestha; Sai Roopa Tummala;	2021
(Graduated)		
Master	Neha Sinha; Ashok Kumar Gradde; Kranthi Battu; Yu Sun	2020
(Graduated)		

CREATIVE ACTIVITIES

ACTIVITY	DATES	LOCATION	SPONSORSHIP
Software. OpenHuFu: An Open-	2022	Available at https://github.com/BUAA-BDA/OpenHuFu	
Sourced Data Federation System			
Software. Identifying Experts	2021	Available at	
Over Online Question/Answer		https://github.com/ahushrestha/MS_Project/tree/master/cgcn_ui	
Platforms			
Software. Efficient K-Core	2021	Available upon request	
Decomposition over Dynamic			
Graphs			
Software. Identification of Fake	2021	Available at https://github.com/stmmala/Master-Project	
Resumes Using Machine			
Learning Techniques			
Software. CommEx: Visualized	2020	https://github.com/neha-26/MastersProject-Neha	
interactive community/dense			
component exploration			
Software. GraphProfile: Fast and	2019	https://github.com/zxf-work/GraphProfile	
accurate profiling of graph data			

Books Published

(Book Chapter) Xiaofei Zhang, Lei Chen. (2014). Efficient Join Query Processing on the Cloud. *Cloud Computing and Digital Media*, 191-234.

Refereed Journal Publications

[j7] Yongxin Tong, Xuchen Pan, Yuxiang Zeng, Yexuan Shi, Chunbo Xue, Zimu Zhou, **Xiaofei Zhang**, Lei Chen, Yi Xu, Ke Xu, Weifeng Lv. (2022). Hu-Fu: Efficient and Secure Spatial Queries over Data Federation. *Pro. of the VLDB Endowment* Vol. 15(6), pp. 1159-1172 (h5-index 73; Acceptance rate: 18.2%).

[j6] **Xiaofei Zhang**, M. Tamer Özsu. (2019). Correlation Constraint Shortest Path over Large Multi-Relation Graphs. *Proc. of the VLDB Endowment*, Vol. 12(5), pp. 488-501 (Impact Factor: 3.56; h5-index: 70; Acceptance Rate: 16.7%).

[j5] Xiaofei Zhang, Lei Chen. (2017). Distance-Aware Selective Online Query Processing Over Large Distributed Graphs. *Data Science and Engineering*, Vol. 1, pp. 1-20 (Impact Factor: 0.85; h-index: 17(SJR source)).

[j4] **Xiaofei Zhang**, Hong Cheng, Lei Chen. (2015). Bonding Vertex Sets over Distributed Graphs: A Betweenness Aware Approach. *Proc. of the VLDB Endowment*, Vol. 8 (12), pp. 1418-1429 (Impact Factor: 3.56; h5-index: 70; Acceptance Rate: 18.4%).

[j3] Xiaofei Zhang, Lei Chen, Min Wang. (2015) Efficient Parallel Processing of Distance Join Queries Over Distributed Graphs. *IEEE Trans. Knowl. Data Eng.*, Vol. 27 (3), pp. 740-754 (Impact Factor: 4.56; h5-index: 81).

[j2] **Xiaofei Zhang**, Lei Chen, Yongxin Tong, Shicong Feng. (2014). Locality-aware Allocation of Multi-dimensional Correlated Files on the Cloud Platform. *Distributed and Parallel Databases*, Vol. 33 (3), pp. 353-380 (Impact Factor: 1.53; h-index: 41 (SJR source)).

[j1] Xiaofei Zhang, Lei Chen, Min Wang. (2012). Efficient Multi-way Theta-join Processing using MapReduce. *The VLDB Endowment*, Vol. 5 (11), pp. 1184-1195 (Impact Factor: 3.56; h5-index: 70; Acceptance Rate: 20.3%).

Refereed Conference Publications

[c12] Ryan Wickman, Junxuan Li, **Xiaofei Zhang**. (2023). VLS: A Reinforcement Learning-based Value Lookahead Strategy for Multiproduct Order Fulfillment. *International Conference on Advanced Data Mining and Applications 2023*, to appear (Acceptance rate: 33%).

[c11] Ryan Wickman, Bibek Poudel, Michael Villarreal, **Xiaofei Zhang**, Weizi Li. (2023). Efficient Quality-Diversity Optimization through Diverse Quality Species. *In Genetic and Evolutionary Computation Conference Companion (GECCO '23 Companion)*, pp. 699-702 (h5-index: 39; Acceptance rate: 35%).

[c10] Xuchen Pan, Yongxin Tong, Chunbo Xue, Zimu Zhou, Junping Du, Yuxiang Zeng, Yexuan Shi, **Xiaofei Zhang**, Lei Chen, Yi Xu, Ke Xu, Weifeng Lv. (2022). Hu-Fu: A Data Federation System for Secure Spatial Queries (DEMO). *Proc. of the VLDB Endowment*, Vol. 15(12), pp. 3582-3585 (h5-index: 73; Acceptance rate: 18.2%).

[c9] Ryan Wickman, **Xiaofei Zhang**, Weizi Li. (2022). A Generic Graph Sparsification Framework using Deep Reinforcement Learning. *IEEE Int. Conf. on Data Mining (ICDM)*, pp. 1221-1226 (h5-index: 53; Acceptance rate: 15%)

[c8] Leigh Harrell-Williams, Christ Mueller, Stephen Fancsali., Steve Ritter, **Xiaofei Zhang**, Deepak Venugopal. (2021). The Nature of Achievement Goal Motivation Profiles: Exploring Situational Motivation in An Algebra-focused Intelligent Tutoring System. *Proceedings of the Learner Data Institute Workshop at the Fourteenth International Conference on Educational Data Mining*.

[c7] Leigh M. Harrell-Williams, Christ Mueller, Stephen Fancsali, Steve Ritter, **Xiaofei Zhang**, Deepak Venugopal. (2022). Exploring Stability in Multilevel Achievement-Goal Profile Membership in Mathematics Learning in an Intelligent Tutoring System. *The 22nd American Educational Research Association Annual Meeting*, San Diego, CA.

[c6] Xiaofei Zhang, M. Tamer Özsu, Lei Chen. (2020). ELite: Cost-effective Approximation of Exploration-based Graph Analysis. *Proc. of the 3rd Joint International Workshop on Graph Data Management Experiences & Systems (GRADES) and Network Data Analytics (NDA)*, no. 6, pp. 1–10 (Acceptance rate: 18.6%).

[c5] Yongxin Tong, **Xiaofei Zhang**, Lei Chen. (2016). Tracking Frequent Items over Distributed Probabilistic Data. *World Wide Web*, Vol. 19 (4), pp. 579-604 (Impact Factor: 2.89; h5-index: 80; Acceptance Rate: 15.8%).

[c4] Yongxin Tong, Xiaofei Zhang, Calab C. Cao, Lei Chen. (2014). Efficient Probabilistic Supergraph Search over Large Uncertain Graphs. *Proc. 23rd ACM Int. Conf. on Information and Knowledge Management*, pp. 809-818 (h5-index: 54; Acceptance Rate: 20.8%).

[c3] Xiaofei Zhang, Lei Chen, Min Wang. (2013). EAGRE: Towards Scalable I/O Efficient SPARQL Query Evaluation on the Cloud. *Proc. 29th Int. Conf. on Data Engineering*, pp. 565-576 (h5-index: 56; Acceptance Rate: 18.4%).

[c2] Xiaofei Zhang, Lei Chen, Min Wang. (2012). Towards Efficient Join Processing over Large RDF Graph using MapReduce. *Proc.* 24th Int. Conf. on Scientific and Statistical Database Management, pp. 250-259 (h-index: 32 (SJR source); Acceptance Rate: 24.5%).

[c1] Xiaofei Zhang, Lei Chen. (2011). Fault Tolerance Study for Durable Storage on the Cloud. *Int. Conf. on Cloud and Service Computing*, pp. 360-365 (h-index: 15 (SJR source); Acceptance Rate: 22.8%).

Non-Refereed Publications

[t4] Xiang Lian, Xiaofei Zhang. (2023). DNN-as-a-Database: Learning-Based Data Storage via Deep Neural Networks. *Technical Report* arXiv:2206.05778 [cs.DB].

[t3] Manish Kasu, Xiaofei Zhang. (2023). Spam Review Detection Techniques: A Survey. Technical Report.

[t2] Ryan Wickman, Xiaofei Zhang, Weizi Li. (2021). LRN: Limitless Routing Networks for Effective Multi-task Learning. *Technical Report.*

[t1] Ryan Wickman, Xiaofei Zhang, Weizi Li. (2021). SparRL: Graph Sparsification via Deep Reinforcement Learning. *Technical Report* arXiv:2112.01565 [cs.LG].

Presentations - Conference (refereed *)

[07/18/23] Oral and Poster presentation. Efficient Quality-Diversity Optimization through Diverse Quality Species. GECCO'23 @ Lisbon, Portugal (Virtual Participant).

[11/30/22] Oral presentation. A Generic Graph Sparsification Framework using Deep Reinforcement Learning. 22nd International Conference on Data Mining @ Orlando, USA.

[06/14/20] Oral and Poster presentation. ELite: Cost-effective Approximation of Exploration-based Graph Analysis, GRADES-NAS, SIGMOD'20 Virtual.

[08/29/19] Oral and Poster presentation. Correlation Constraint Shortest Path over Large Multi-Relation Graphs. 45th International Conference on Very Large Data Bases @ Los Angeles, CA, USA.

[09/02/15] Oral presentation. Bonding Vertex Sets over Distributed Graphs: A Betweenness Aware Approach. 41th International Conference on Very Large Data Bases @ Hawaii, USA.

[04/09/13] Oral presentation. EAGRE: Towards Scalable I/O Efficient SPARQL Query Evaluation on the Cloud. 29th IEEE International Conference on Data Engineering @ Brisbane, Australia.

[08/30/12] Oral presentation. Efficient Multi-way Theta-join Processing using MapReduce. 38th International Conference on Very Large Data Bases @ Istanbul, Turkey.

[06/25/12] Oral presentation. Towards Efficient Join Processing over Large RDF Graph using MapReduce. 24th International Conference on Scientific and Statistical Database Management @ Chania, Crete, Greece.

Presentations - Universities/Industry (refereed *)

[09/02/22] Invited Talk. Cybersecurity Data Management via Graph Database. FedEx InfoSec Group.

[12/15/21] Invited Talk. Secure Spatial Query Evaluation over Federated Database Systems. Kent State University, Big Data Computing Lab.

[10/13/21] Oral Presentation. Adaptive Learners Profiling via Graph Mining. LDI (Learners' Data Institue) concrete task seminar.

[06/18/21] Invited Talk. Graph Sparsification via Deep Reinforcement Learning. Hong Kong University of Science & Technology, Database group seminar.

[03/22/18] Seminar talk. Online Selective Query Processing over Distributed Graph, Department of Computer Science, University of Memphis.

[03/01/17] Seminar talk. Message Balancing for Think-Like-A-Vertex Graph Processing, Cheriton School of Computer Science, University of Waterloo.

[11/16/16] Seminar talk. Predicate Aware Shortest Path Computing_over Multi-relational Graph, Cheriton School of Computer Science, University of Waterloo.

[05/22/15] Research talk. Efficient Processing of Complex Join Queries over Distributed Data, Huawei Noah's Ark Lab.

[09/10/13] Seminar talk. Efficient Processing of Complex Join Queries on Cloud, Department of System Engineering & Engineering Management, Chinese University of Hong Kong.

SUPPORT

(External)

ACTIVITY	AGENCY/SOURCE	AMOUNT	PERIOD
(Awarded) Collaborative Research: PPoSS: Planning: Efficient and	NSF 22-507 Principles and	\$148,750	10/01/22 -
Scalable Learning and Management of Distributed Probabilistic	Practice of Scalable Systems		09/30/24
Graphs, PI	(PPoSS)		
(Awarded) Designing Machine Learning-based Solutions for APT	FedEx Corporate Services,	\$461,151	08/01/22 -
Detection, Co-PI (PI: Dr. Kan Yang)	Incorporated (FCS)		07/31/25
(Completed) Learners' Data Institute: Harnessing The Data	NSF 19-549	\$2,586,706	01/01/20-
Revolution To Improve The Effectiveness, Efficiency, and			12/31/21
Engagement of The Learning Ecosystem, Key Participant (PI: Dr.			
Vasile Rus)			
(Pending) CAREER: Algorithm and System Co-design for Efficient	NSF 22-586	\$531,202	07/01/24-
and Secure Analytics over Graph Data Federations, PI			06/30/29

(Pending) Conference Towards Building Mid-South Alliance for Research Development, Industrial Collaboration, and Workforce Diversification in Data Science and AI, Investigator (PI: Dr. Xiaolei Huang)

Internal Support

ACTIVITY	AGENCY/SOURCE	AMOUNT	PERIOD
(Active) Vocational Rehabilitation Curriculum	The University of Memphis Institute on	\$50,000	06/01/20-Present
Development, Consultant	Disability (UMID)		
(Completed) Real-time Log Analysis for Network	FIT FRONTIERS Award	\$10,000	06/01/2022-
Security Monitoring using Graph Database, PI			5/30/2023
(Completed) Online course development	University of Memphis Global	\$4,000	09/01/19-
(COMP7/8118-M50 Data Mining), Course Developer	Education		-12/31/19
(Completed) Modeling the COVID-19 epidemic over a	The University of Memphis, Data	\$2,000	05/01/20-
hybrid spatial network, Co-PI	Science Cluster		06/30/20

OUTREACH

Project/s summary

PROJECT	PARTICIPANTS	PERIOD	SPONSORSHIP
The University of Memphis information	Staff of St Jude Children's	2019; 2020;	St Jude Children's Research
session at St Jude Children's Research	Research Hospital	2021	Hospital, University of Memphis
Hospital			

SERVICE

UNIVERSITY	COMMITTEE/ACTIVITY	PERIOD
The University of Memphis	Graduate Admission Committee (CS Dept.), Acting Committee Chair from 08/23.	2019 - Present
The University of Memphis	Graduate Program Committee (CS Dept.)	2018 - 2019

OTHER

SOCIETY/ORGANIZATION/JOURNAL	COMMITTEE/EDITORIAL BOARD/OFFICE	PERIOD
NSF Panel	Invited Reviewer	2021-2023
Hong Kong Research Grant Council	Invited Reviewer	2021-2023
ACM SIGMOD/PODS International Conference on	COMMITTEE	2020
Management of Data		
Very Large Data Base Endowment Inc. (VLDB	COMMITTEE	2019, 2021, 2022, 2023, 2024
Endowment)		
IEEE International Conference on Data Engineering	COMMITTEE	2022, 2023
ACM Conference on Information and Knowledge	COMMITTEE	2022, 2023
Management		
IEEE International Conference on Big Data	COMMITTEE	2017, 2018
SIAM International Conference on Data Mining (SDM)	COMMITTEE	2020, 2022
International Conference on Database Systems for	COMMITTEE	2019, 2020, 2021, 2022
Advanced Applications		
IEEE Transactions on Knowledge and Data Engineering	Invited Reviewer	2013, 2015, 2016, 2017,
		2018, 2020, 2021, 2022, 2023
ACM Transactions on Database Systems	Invited Reviewer	2019
Mobile Service Computing	Invited Reviewer	2018, 2019, 2020
Mobile Networks and Applications	Invited Reviewer	2018, 2019, 2020

Appendix A

Academic Year <u>(please</u> <u>indicate year)</u>	Course #	Course Name	Credit Hours	Percent Taught	Enroll	Labratory Supervised(S)/Instructed(I)	New Preparation (Y) /(N)
2023 Spring	COMP7/8118	Data Mining	3	100%	58		

2023 Spring	COMP7/8116	Advanced Database Systems	3	100%	49	
2022 Fall	COMP7/8118- M50	Data Mining	3	100%	150	
2022 Fall	COMP7/8116	Advanced Database Systems	3	100%	75	
2022 Spring	COMP4/6118	Introduction to Data Mining	3	100%	31	
2022 Spring	COMP7/8118- M50	Data Mining	3	100%	39	
2021 Fall	COMP7/8118- M50	Data Mining	3	100%	26	
2021 Fall	COMP7/8116	Advanced Database Systems	3	100%	9	Y
2021 Spring	COMP 7/8118- M50	Data Mining	3	100%	9	
2020 Fall	COMP 7/8118- M50	Data Mining	3	100%	18	
2020 Spring	COM7118- M50	Data Mining	3	100%	12	Y
2019 Fall	COMP7118	Data Mining	3	100%	11	Y
2019 Spring	COMP4/6118	Introduction to Data Mining	3	100%	14	Y
2019 Spring	COMP7/8991	Big Data Computing	3	100%	15	Y

Appendix D

CICI:UCSS: Secure and Privacy-preserving Federated Data Services for Collaborative Scientific Research, Co-PI (PI: Dr. Kan Yang), NSF CICI, \$599,966, 07/01/23-06/30/26

Collaborative Research: III: Small: Efficient and Quality-Aware Graph Analytics via Graph Neural Network Based Embedding, Co-PI (PI: Dr. Xiang Lian), NSF 23-561, \$325,736, 01/01/24-12/31/26

Collaborative Research: III: Small: Effective Management of Learning-based Data Storage, Co-PI (PI: Dr. Xiang Lian), NSF 21-616 CISE, \$314,065, 09/01/23-08/31/26

Exploring In-the-Moment Motivation Profiles and Learning Behaviors during Mathematics Learning in an Intelligent Tutoring System, Co-PI (PI: Leigh Williams), The Spencer Foundation, \$250,000, 01/01/23-12/31/26

Towards efficient and secure private data aggregation via reinforcement learning empowered graph sparsification, PI, Meta Research, \$95,969, 09/01/22-08/31/23

Towards Optimized Networking for AI via Deep Reinforcement Learning, Co-PI (PI: Weizi Li), Meta Research, \$50,224, 09/01/22-08/31/23

CAREER: Algorithm and System Co-design for Efficient and Secure Analytics over Data Federations, PI, NSF, \$573,730, 07/01/23-06/30/28

TAYLOR: Transitional Transfer(T) Application (A) for young adults (Y) with Learning difficulties (L): An Occupational (O) Resource (R), Investigator (PI: Chrisann Schiro-Geist), Social Security Administration, \$1,584,473, 01/01/23-12/31/27

Computing proposal for Memphis Electrical Network Behavior Modeling, PI, Tenessee Valley Authority (TVA) research, \$107,902, 02/01/23-01/31/24

Exploring In-the-Moment Motivation Profiles and Learning Behaviors during Mathematics Learning in an Intelligent Tutoring System, co-PI (PI: Leigh Williams), The Spencer Foundation small grant, \$50,000, 07/01/22-06/30/24.

Changing the Paradigm on Client Assistance Program (CAP): A Social Justice Model, Senior Personnel (PI: Chrisann Schiro-Geist), US Department of Education (US DoEd) 2021-13190 Rehabilitation Short-term Training: CAP, \$1,536,634, 10/01/21-09/30/26.

CAREER: Algorithm and System Co-design for Efficient and Secure Analytics over Data Federations, PI, NSF 20-525 CAREER, \$549,929, 06/01/22-05/31/27.

Distributed Property Graph Learning and Management: An Adaptive View Maintenance Approach, PI, Facebook, Inc Nextgeneration Data Infrastructure request for proposals, \$50,000, 09/01/21-08/31/22.

Collaborative Research: SCH: Smart Detection and Prediction of the Disease Spread from Large-Scale Spatial-Social Networks, co-PI (PI: Xiang Lian), NSF 21-530 Smart Health and Biomedical Research in the Era of Artificial Intelligence and Advanced Data Science (SCH), \$533,893, 10/01/21-09/30/25.

Collaborative Research: FMitF: Track I: Integrating Formal Methods into Property Graph Learning and Management, PI, NSF 20-613 Formal Methods in the Field (FMitF), \$517,441, 10/01/21-09/30/25.

Collaborative Research: PPoSS: Planning: Efficient and Scalable Learning and Management of Distributed Probabilistic Graphs, PI, NSF 21-513 Principles and Practice of Scalable Systems (PPoSS), \$170,319, 09/01/21-08/31/22.

HDR Institute: The Learner Data Institute - Harnessing The Data Revolution To Make The Learning Ecosystem More Effective, Engaging, and Equitable, Senior Personnel (PI: Vasile Russ), NSF 21-519 Harnessing the Data Revolution (HDR): Institutes for Data-Intensive Research in Science and Engineering, \$4,038,005, 10/01/21-09/30/26

Collaborative Research: PPoSS: Planning: Scalable Online Geo-Social Network Analytics and Mining: A Resource-Adaptive and Context-Aware Framework, co-PI (PI: Xiang Lian), NSF 21-513 Principles and Practice of Scalable Systems (PPoSS), \$100,137, 09/01/21-08/31/22

Collaborative Research: FMitF: Track I: Integrating Formal Methods into Distributed Probabilistic Graph Learning and Management, PI, NSF 19-613 Formal Methods in the Field (FMitF), \$381,202, 09/01/20-08/31/23

SCH: INT: Collaborative Research: Smart Detection and Prediction of the Disease Spread from Large-Scale Spatial-Social Networks, PI, NSF 18-541 Smart and Connected Health (SCH), \$378,332, 10/01/20-09/30/23

Collaborative Research: III: Small: Developing Runtime Optimization for Highly Efficient OLAP/OLTP over Property Graphs, PI, NSF 19-589 Computer and Information Science and Engineering (CISE): Core Programs, \$394,835, 06/01/20-05/30/23

CRII:III: Developing Runtime Optimization for Highly Efficient OLAP/OLTP over Property Graphs, PI, NSF 20-593 Computer and Information Science and Engineering (CISE) Research Initiation Initiative (CRII), \$241,673, 06/01/19-05/31/21