VINAYAK TANKSALE
Senior Lecturer of Computer Science
Ball State University

PART I. PERSONAL DATA

A. EDUCATION

Degree	Date	University	Major
PhD	Expected May 2022	Purdue University	Computer Engineering
MS	May 2001	Purdue University	Computer Science
BS	Aug 1999	The University of Toledo	Computer Science and Engineering

B. INITIAL EMPLOYMENT AT BALL STATE

Date: Aug 2001
Rank: Instructor (Title administratively changed to Lecturer on Jan 1, 2018)

C. PROMOTIONS AT BALL STATE

Effective Date	From (rank)	To (rank)
Aug 2018	Lecturer	Senior Lecturer

D. PROFESSIONAL EMPLOYMENT PRIOR TO ARRIVAL AT BALL STATE

Title	Dates	Organization
Graduate Assistant	Aug 99 – May 00, Aug 00 – May 01	Purdue University
Software Design Engineer Intern	May 00 – Aug 00	Microsoft Corporation

E. FIELD(S) OF PROFESSIONAL SPECIALIZATION

Cyber-Security, Cryptography, Software Architectures, Networking, Forensics**,** Emerging Media, Immersive Learning

F. MY PRIMARY ROLE AS A FACULTY MEMBER AT BALL STATE

Teach a variety of undergraduate and graduate courses in support of computer science major and minor programs. Ensure that courses reflect current computer science thinking and technologies. Active involvement in research on sponsored projects. Maximize student achievement; provide input to various committees, revision of core CS curriculum.

G. HIGHLIGHTS

- Named to the top 50 Technology in Education Innovators in the nation by the Center for Digital Education
- Recipient of 15 funded projects (external and internal)
- Authored book chapters, journal articles, and technical papers
- Invited presentations at CES 2018 and CES 2017 in Las Vegas
- TechPoint MIRA Award Finalist in the Education Contribution to Technology – Individual category (2011 and 2012)
- Extensive experience in the use of various innovative techniques and educational technologies to enhance student learning in on-campus, online, and hybrid courses
- Considered for a National Emmy Award Nomination
- Recipient of six Emerging Media Innovation Grants
- Researcher in the Software Engineering Research Center
- Proven track record of successfully delivering inter-disciplinary software projects
- Three Teaching awards as a graduate assistant at Purdue University
- Innovative Learning practices in the classroom
- Excellent Student feedback and reviews, Always Available and Easily Accessible to Students
- Faculty Fellow in the Center for Media Design
- Curriculum Development

PART II. ACCOMPLISHMENTS

A. EVIDENCE OF OUTSTANDING TEACHING

Over the last 20 years of teaching, my guiding philosophy has always been to create a favorable learning environment for students. Hands-on learning has always been the pillar of my pedagogy. I write programs in class to teach students how to program rather than demonstrate code that was already developed by me prior to class. I require students to develop code during class by way of in-class exercises. I strongly encourage discussion amongst students and provide opportunities for group work when deemed necessary. A majority of the students' grade in a programming-intensive course (CS 397, CS310, CS 320) is based on software development as opposed to written exams. Labs are a major component of the grade in courses such as CS 120, CS 121, CS 249. I spend a lot of time solving networking, security, and systems problems in upper-division courses instead of lecturing from prepared notes. I use technology extensively (Mediasite, Webex) for the benefit of the students. This is in addition to the standard use of learning management systems such as Blackboard and Canvas and common presentation and demonstration software. I invite successful alumni to speak to my students (in-person or remotely). I have received excellent reviews of my teaching as evidenced in the student evaluations and peer reviews.

1. Classroom Instruction:
   a. Classes taught:
      i. CS 104 Introduction to Computers
      ii. CS 110 Introduction to Computer Science
      iii. CS 116 Programming for non-majors
      iv. CS 120 Computer Science 1
      v. CS 121 Computer Science 2
      vi. CS 124 Discrete Structures
      vii. CS 203 Introduction to Computer Security
      viii. CS 204 Personal Computing
      ix. CS 205 Multimedia Programming
      x. CS 206 Digital Imaging for the Web
      xi. CS 230 Computer Architecture and Assembly Language
      xii. CS 232 Data Structures
      xiii. CS 249 Digital Forensics
      xiv. CS 300 Networking for non-majors
      xv. CS 310 Web Programming
      xvi. CS 320 Mobile Application Development
      xvii. CS 327 Computer Networks
      xviii. CS 335 Programming Languages
      xix. CS 339 Advanced Topics Seminar
      xx. CS 376 Operating Systems
      xxi. CS 397 Multi-tier Software Architectures
      xxii. CS 446 System Administration
      xxiii. CS 447 Network Security
      xxiv. CS 499 Independent Study
      xxv. CS 527 Computer Networks
      xxvi. CS 547 Network Security
      xxvii. CS 576 Operating Systems
      xxviii. CS 597 Multi-tier Software Architectures
      xxix. CS 614 Web Programming
      xxx. CS 616 Digital Animation
      xxxi. CS 629 System Administration
      xxxii. CS 639 Seminar in Computer Science
      xxxiii. CS 699 Independent Study

   b. Student ratings:

	2017	2016	2015	2014	2013
My instructor explains the course objectives clearly.	4.35	4.58	4.29	4.55	4.50
My instructor explains course content clearly.	4.31	4.60	4.26	4.51	4.50
My instructor effectively engages me in the learning process.	4.03	4.58	4.33	4.55	4.46
My instructor is respectful when I have a question or comment.	4.51	4.62	4.52	4.69	4.68

My instructor provides opportunities for students to engage in the learning process.	4.21				
My instructor provides timely feedback.	4.32	4.32	4.25	4.50	4.38
My instructor is available for consultation (e.g., email, office hours, by phone, by videoconference, or by appointment).	4.41	4.43	4.32	4.52	4.52
This course has clear objectives.	4.58	4.49	4.23	4.50	4.45
This course is effective in meeting its objectives.	4.39	4.42	4.16	4.48	4.37
This course has assignments related to the objectives of the course.	4.62	4.60	4.35	4.53	4.53
This course has a clear grading system.	4.67	4.56	4.38	4.66	4.56
This course broadens my perspective and/or knowledge.	4.50	4.51	4.34	4.53	4.49
Presents the subject in an interesting manner	4.00	4.18	3.99	4.22	4.21
Organizes material in an effective manner	4.28	4.36	4.09	4.50	4.36
Responds helpfully to questions in and out of class	4.32	4.53	4.32	4.57	4.52
Tests materials emphasized in the course	4.41	4.45	4.23	4.53	4.53
Grades fairly	4.55	4.56	4.40	4.66	4.67
Provides feedback on work evaluated	4.07	4.27	4.04	4.34	4.22
Overall rating of instructor	4.25	4.49	4.32	4.60	4.53
Before this term began, my desire to take this course.	4.17	4.16	4.07	4.14	4.12
Amount I learned in this course	4.05	4.40	4.12	4.16	4.27
Amount I studied for this course	3.62	3.62	3.74	3.70	3.75
Degree to which I found this course challenging	3.72	3.67	3.81	3.68	3.76

2. Other Instructional Activity:
    a. Implementor of instructional innovation
        i. Interactive Learning Spaces
        ii. Studio-based learning
        iii. Project-based learning
        iv. Inter-disciplinary courses
        v. Immersive learning
        vi. Canvas pilot
        vii. Peer instruction
        viii. Pair programming
        ix. iClicker

    b. Initiator of new programs/courses
        i. Designed the Digital Forensics minor and a majority of its courses
        ii. Designed the studio course in interactive media

iii. Designed the following new courses:
    a. CS 447 Network Security
    b. CS 397Multi-tier Software Architectures
    c. CS 203 Introduction to Computer Security
    d. CS 320 Mobile Application Development
    e. CS 614 Web Programming
    f. CS 616 Digital Animation
    g. CS 629 System Administration

iv. Development of multiple online and hybrid courses

c. Thesis/dissertation committee member or chairperson
None

d. Research paper/creative project adviser
Undergraduate Honors Theses
Joseph Morris -- Operating System Development for the Intel x86
Todd Chaffins and Seth Lemons -- Genetic Programming

B. EVIDENCE OF SCHOLARSHIP

1. Refereed publications (excluding abstracts), published or accepted for publication
    a. V. Tanksale, "Design of Anomaly Detection Functions for Controller Area Networks," in IEEE Open Journal of Intelligent Transportation Systems, vol. 2, pp. 312-321, 2021, doi: 10.1109/OJITS.2021.3104495.
    b. V. Tanksale, "Anomaly Detection for Controller Area Networks Using Long Short-Term Memory," in IEEE Open Journal of Intelligent Transportation Systems, vol. 1, pp. 253-265, 2020, doi: 10.1109/OJITS.2020.3043066.
    c. V. Tanksale, "Controller Area Network Security Requirements," 2020 International Conference on Computational Science and Computational Intelligence (CSCI), 2020, pp. 157-162, doi: 10.1109/CSCI51800.2020.00034.
    d. V. Tanksale, "Intrusion Detection For Controller Area Network Using Support Vector Machines," 2019 IEEE 16th International Conference on Mobile Ad Hoc and Sensor Systems Workshops (MASSW), Monterey, CA, USA, 2019, pp. 121-126.
    e. Tanksale V., Yadon R., Perkins J. (2018) Design, Develop, and Deploy a Wellness Index Dashboard Utilizing Commonly Available Sensors in the Form of Wearable Technology to Monitor Heterogeneous Data. In: Bi Y., Kapoor S., Bhatia R. (eds) Proceedings of SAI Intelligent Systems Conference (IntelliSys) 2016. IntelliSys 2016. Lecture Notes in Networks and Systems, vol 16. Springer, Cham
    f. George-Palilonis, J., Hanley, M. and Tanksale, V. (2009). Research Informed Development for Interactive Media: Engaging Students with their Audiences Enhances Learning. In Worley, D. W., et. al. (Eds.), *Best Practices in Experiential and Service Learning in Communication.* Kendall/Hunt Publishing Company.
    g. Hanley, M., George-Palilonis, J., and Tanksale, V. (2008). Research-Informed Development for Interactive Media: Enhancing Learning by Engaging Students

with Users. *Journal of Interactive Advertising*, *9*(1).

h. George-Palilonis, J., Smith, K., Smith, S. Hanley, M., Tanksale, V. and Flook, C. (2010). Creating Smartphone Interactive News and Advertising Content. *The Journal of the International Digital Media and Arts Association 7*(1): 45-54.

i. George-Palilonis, J., Hanley, M. and Tanksale, V. (2009). Research Informed Design: Process, Experience, & Results from Students & Their Audiences. *The Journal of the International Digital Media and Arts Association, 6*(2), 37-47.

j. Hanley, M., George-Palilonis, J., & Tanksale, V. (2008). *An Integrated Approach to Interactive Advertising and News Design Pedagogy Using the Informed Design and Research-Informed Development Models.* An abstract presented at the 2008 Direct Marketing Association Education Foundation Research Summit, Las Vegas, October 11.

k. Jiang, F., Tanksale, V., Salama, P., King, B. (2014). A secure and efficient image transmission system for sharing an image with multiple parties, IUPUI Research Symposium 2014, Indianapolis, Indiana

2. Contract, Grants, and Funding for Research/Creative Endeavors

a. External

i. Channel One ($741,190) - Inbound Alerts Network -- Develop highly scalable database driven real-time alert system

ii. Security Measurements and Assuring Reliability through Metrics Technology - This project was funded by the US Army Research Lab. Wayne and Dolores Zage were the PIs and I was a consultant on this project. I was responsible for security and vulnerability measurements of software systems, developing security metrics primitives, analysis of metric counts and vulnerability reports, and correlation between software design constructs and software vulnerabilities.

iii. Viewing+ - Lead software developer for the Viewing+ Initiative (industry supported design, development, and research of interactive television applications)

iv. LifeWerx: An Interactive Virtual Collaboration Environment - This project was funded by Rockwell Collins. I was a co-PI along with Dolores Zage and John Dailey. We used an existing virtual environment to build a virtual workplace for Rockwell Collins. The primary goal was to help them in their various software engineering processes.

v. Interactive Television - As a follow up to the interactive television course that I co-taught in Spring 2006, I have been developing more interactive television projects with industry partners. Industry partners that are involved in these projects are Schematic, Yahoo, BBC, and Microsoft.

vi. Mobile Research - Design and Deploy various campaigns that use mobile devices. Examples of campaigns include text to win, newspaper polls, weather and traffic alert system, and media and content delivery. Analyze data and findings obtained through such campaigns.

vii. Mapping Caché Artifacts to Design Metrics Primitives ($10,000) - This

project was funded by Ontario Systems (Muncie, IN). We used design metrics primitives to count the software metrics for Caché systems, developed by Ontario Systems, in order to find a correlation between metrics and fault proneness in Caché systems.

viii. Electronic Teaching Consortium - This project was funded by the US Department of Education. Wayne Zage and Dolores Zage were the PIs from Computer Science and I was a consultant on this project. We prepared instructional modules in object-oriented technologies that would be used in employee training.

ix. News Research Institute - Provide technical assistance to the News Research Institute and Newslink Indiana

x. Internet Protocol Television (IPTV) - Develop IPTV applications, design and deploy an IPTV test bed on the BSU campus, and seek external sources of funding for IPTV projects.

b. Internal

i. Digital Forensics ($25,000) - This project was funded by the Discovery group. I developed and taught an inter-disciplinary course in Digital Forensics. This course was the cornerstone of the digital forensics minor that I developed. Students from computer science, criminal justice and criminology, and social work took the course. Students learnt industry tools and techniques using hands-on labs and assignments.

ii. Interactive C-SPAN ($10,000) - Develop an interactive television interface for cable television systems. Collaboration with Brandon Waite (Political Science)

iii. Personal Residential Automation Network Kit ($10,000) - Develop a software architecture that allows consumers to travel with their home network. Collaboration with Mahesh Senagala (Architecture)

iv. Wi-Fi and Bluetooth based location detection system ($10,000) - Use Wi-Fi and Bluetooth to accurately detect location. Collaboration with Paul Buis (Computer Science)

v. iMedia ($10,000) - Develop interactive television and smart phone interfaces for delivering news, sports, entertainment, weather, and advertising information. Collaboration with Jennifer George-Palilonis and Michael Hanley (Journalism), Kirsten Smith (CICS), Suzy Smith and Christopher Flook (Telecommunications)

vi. Remote Elderly Monitoring System ($10,000) - Perform preliminary research on variety of sensors that collect behavioral data. Collaboration with Robert Yadon (Information and Communication Sciences) and Jane Ellery(Gerontology)

vii. Educational Games for iPhone ($10,000) - Develop three educational games for the iPhone (Chemistry, Political Science, and Computer Science). Collaboration with Jay Bagga (Computer Science)

viii. Interactive Learning Space Initiative ($2,000) - Teach multiple CS courses in ILS classrooms and conduct research on student learning.

ix. Business Fellows - Under my guidance, Ball State University students developed a web based software system that helps police

departments across the state keep track of their officer's training records over their entire career. This system helps police departments eliminate large amounts of paperwork and also streamlines their reporting requirements to various state agencies.

x. Lumina Foundation - Paul Ranieri from the Department of English is the PI on this project. My part of the project was titled Sustaining Learning in Early Major Computer Science Courses. My work focused on improving the learning of students in CS 120 (Programming I) which is the first course taken by students majoring in computer science.

3. Papers presented at professional meetings (invited or refereed)

a. V. Tanksale, "Intrusion Detection For Controller Area Network Using Support Vector Machines," presented at 2019 IEEE 16th International Conference on Mobile Ad Hoc and Sensor Systems Workshops (MASSW), Monterey, CA, USA
b. Invited presentation on Blockchain at CES 2018, Las Vegas
c. Technical Chair of IEEE Cloud Summit 2018 ICCE Conference
d. Invited presentation on cyber-security at CES 2017, Las Vegas
e. General Chair of IEEE Cloud Computing 2017 ICCE Conference
f. George-Palilonis, J., Smith, K., Hanley, M., Tanksale, V., Smith, S. and Flook, C. (2010). "Enhancing digital content with a multimedia mobile news and advertising application: A case study," presented at the Newspapers & Community-Building Symposium XVI, Omaha NE.
g. Tanksale, V., Waite, B., and Cooper, D. *Interactive C-SPAN*, Presentation at the EDUCAUSE Learning Initiative Conference as part of New Media Consortium's Horizon Report, Washington, D.C. Feb. 2011.
h. Crutchfield, J., Tanksale, V., Meister, T., et al. *Microsoft Surface Application Development*, Presentation at the Mobile/Virtual Learning Showcase at the EDUCAUSE Learning Initiative Conference, Austin, TX, Jan. 2010.
i. *Collaboration & convergence: Merging diverse content in the interdisciplinary classroom,* Jennifer George-Palilonis, Vinayak Tanksale, & John Dailey, at the Convergence and Society: Media Ownership, Control, & Consolidation - Conference in Columbia, SC, Oct 2007.
j. *Mobile Marketing*, Invited Presentation at the International Association of Business Communicators, Indianapolis, IN, Sep 2007.
k. *Sustaining Learning in Early Major Computer Science Courses*, poster presentation at the ACM SIGCSE conference in Houston, Mar 2006.
l. *Mapping Caché Artifacts to Design Metrics Primitives*, 2003 and 2004 International Conference on Software Engineering Research and Practice in Las Vegas, NV
m. *Vulnerability Analysis*, Presentation in Fall 2007 (Muncie, IN) and Spring 2007 (West Lafayette, IN) SERC Showcases
n. *Vulnerability Mapping*, Presentation in Fall 2006 SERC Showcase in Muncie, IN
o. *Security Measurements and Assuring Reliability through Metrics Technology*, Spring 2006 SERC Showcase in Schaumburg, IL
p. *Mapping Caché Artifacts to Design Metrics Primitives*, Spring 2002, Fall 2002, Spring 2003 SERC Showcases in Morgantown, WV and Muncie, IN
q. *Adapting Design Metrics Technology to Object Oriented Systems*, Fall 2001 SERC Showcase in Muncie, IN

C. EVIDENCE OF PROFESSIONAL SERVICE

1. Service to the academic community
    a. Committee work: Department, College, University
        i. Member of Dr. Robert Morris' Faculty Advisory Council
        ii. Departmental Service curriculum committee chair
        iii. Various Departmental Curriculum Committees
    b. Special lectures, interdepartmental contributions
        i. Studio-based learning with Journalism and Telecommunications

2. Offices held in local, regional, state, national, and international professional organizations
    a. IEEE Member
    b. ACM Member
3. Editorships, review panels
    a. Technical Chair of IEEE Cloud Summit 2018 ICCE Conference
    b. General Chair of IEEE Cloud Computing 2017 ICCE Conference

D. ADDITIONAL ACCOMPLISHMENTS

1. Media Presence

a. Technology advancements lead to crack in IMPD officer evidence tampering investigation – Fox 59 10 pm news interview and article - http://fox59.com/2017/11/30/technology-advancements-lead-to-crack-in-impd-officer-evidence-tampering-investigation/
b. Online shopping breeds caution – Article in Fulton County Expositor, Nov 2017 - http://www.fcnews.org/news/10976/online-shopping-breeds-caution
c. New device by Marywood team would monitor elderly in their homes – Article in The Times-Tribune, May 2010 -- http://thetimes-tribune.com/news/business/new- device-by-marywood-team-would-monitor-elderly-in-their-homes-1.819808
d. A Room With A View+: Ball State Launches Real-World Interactive TV Lab, Teams With Industry Players – MediaPost's Media Daily News – Nov. 2010
e. The New News -- How television news is being transformed by a class at Ball State University - and by the click of a mouse – Article in American Way magazine, Sep 2007 -- http://www.americanwaymag.com/tabid/2855/tabidext/3275/default.aspx
f. Featured in BSU television commercial
g. Featured in Ball State Bold Video and Brochure
h. Indianapolis Business Journal Article – "Students INC., Ball State hopes for gold as students follow profs into new media ventures" Jan 10, 2009
i. Ball State breaks into new market with Frog Baby Apps, Article in the BSU Daily News, Mar 2011 -- http://www.bsudailynews.com/news/ball-state-breaks-into-new-market-with-frog-baby-apps-1.2513553
j. Tune in Tomorrow – BSU Web site article -- http://cms.bsu.edu/Features/Global/ImmersiveLearning/TuneInTomorrow.aspx

k. Wanted: Hybrid Professionals – Interactive media project is leading television industry's evolution – Article on the BSU web site -- http://cms.bsu.edu/Features/Global/ImmersiveLearning/HybridProfessionals.aspx
l. Campus Expo Magazine Feature – Wireless Security on College Campuses
m. Daily News Article – "10 years and still Googling" Sep 30, 2008
n. Star Press Article – "Law enforcement gets FBI training at Ball State" Thu May 15, 2008
o. Class redefines TV viewing -- Student group works to program interactive, hand- held devices – Article in the BSU Daily News, Apr 2008 -- http://media.www.bsudailynews.com/media/storage/paper849/news/2008/04/03/N ews/Class.Redefines.Tv.Viewing-3300066.shtml
p. Article in the Logansport Pharos Tribune on the Business Fellows project
q. Interview and Comments in the Muncie Star Press on Phishing and e-mail hoaxes
r. Students create interactive broadcast -- Class works to produce user-controlled content with NewsLink Indiana, Article in the BSU Daily News, Apr 2007 -- http://media.www.bsudailynews.com/media/storage/paper849/news/2007/04/27/N ews/Students.Create.Interactive.Broadcast-2885193.shtml

2. Awards

a. Named to the top 50 Technology in Education Innovators in the nation by the Center for Digital Education
b. First Runner-up in the 2009 AT&T Big Mobile on Campus Challenge
c. 2012 TechPoint MIRA Award Finalist in the Education Contribution to Technology – Individual category
d. 2011 TechPoint MIRA Award Finalist in the Education Contribution to Technology – Individual category
e. Considered for a National Emmy Award Nomination, June 2006
f. Graduate Assistant Award for Outstanding Teaching. Purdue University. 2000 – 2001
g. Outstanding Teaching Assistant Award. Computer Science, Purdue University. 2000 - 2001
h. Outstanding Teaching Assistant Award. Computer Science, Purdue University. 1999 – 2000