

Course Syllabus - Spring B 2024

CSE 598: Engineering Blockchain Applications

Course Description

Blockchain technology is revolutionizing digitalization prospects for many industries and emerging as an exciting and rapidly growing field. By detailing the architecture of the technology, this course ensures that learners will be well-versed in blockchain fundamentals. At the same time, it is designed to put learners on the leading edge by presenting the abstract nature of blockchain technology and emphasizing its broad applicability. Topics include the mathematical and cryptographic underpinnings of the technology, as well as mining, consensus protocols, networking, and decentralized governance.

Specific topics covered include:

- Getting started and the Blockchain's abstractions and applications
- Hash Functions
- Cryptographic and Mathematical foundations of the blockchain
- Transactions on the Blockchain
- Mining
- Blockchain Consensus
- Peer-to-Peer Networks
- Governance

Technologies covered include:

- Hyperledger Fabric
- Solidity

Learning Outcomes

Learners completing this course will be able to:

- Navigate the complexities of applying blockchain technology to an area of personal interest
- Navigate relevant documentation and resources to engineer blockchain applications

- Apply the Elliptic Curve Digital Signature Algorithm to identity management and computer security
- Determine the validity of chains given general consensus rules
- Determine whether changes in consensus rules for a Nakamoto network will result in a successful protocol fork
- Compare proof-of-work secured blockchains' security to alternate security methods
- Evaluate an optimal mix of network design and operational parameters to ensure network scalability and throughput
- Evaluate the trade-off between security and computational complexity
- Use Hyperledger Fabric to build a custom decentralized blockchain network configuration
- Use Hyperledger Composer to build a business application
- Deploy an ERC-721 Token Standard contract on an Ethereum-based network using Solidity

Estimated Workload/ Time Commitment Per Week

Average of 18 - 20 hours per week

Required Prior Knowledge and Skills

This course will be very challenging, and learners are expected to learn the necessary technologies on their own time.

Proficient Mathematical Skills and Theoretical Understanding

- Algebra
- Linear Algebra
- Algorithms
- Data Structures
- Operating Systems
- Computer networking

Strong Application Skills

- Confidence executing at least one programming language:
 - Python
 - Go
 - Java
 - C++
 - C
 - Javascript

Note: The course projects will be completed using Golang and Solidity.

Proficient Experience

- Knowledge of networking concepts.
- Experience in programming.
- Understanding of docker containers.
- Familiarity with Node JS is desirable.

Course Access

Your ASU courses can be accessed by both my.asu.edu and asu.instructure.com; bookmark both in the event that one site is down.

Technology Requirements

Honorlock Proctoring System Requirements

- Operating System: Windows 10, macOS 10.14+, Chrome OS
- Browser: Google Chrome (93+)
- Internet Speed: Speed: 1.5 Mbps download, 750 Kbps upload

Hardware

- Standard personal computer with major operating system
 - Linux strongly recommended
- Reliable, strong Internet connection
- Webcam

- Microphone

Software/Other

- Linux, Windows or MacOS with an ability to install docker containers
- npm install
- Golang supported IDE.
- Access to a one of the following browsers: Chrome, Firefox, Edge, Brave
- To complete coursework (e.g., assignments and projects), these applications/languages are required:
 - Solidity
 - Golang

Textbook and Readings

At the graduate level, inquiry, research, and critical reading are part of the learning experience; however, this course does not have a required textbook.

For interested learners, the the faculty course designer recommends the texts:

[Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction](#) Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller & Steven Goldfeder (2016)

[Blockchain Applications, A Hands-on Approach](#) Aeshdeep Bagha (2017)

Course Schedule and Important Dates

Course teams will not be working on ASU's days off* and those are listed in the Course Schedule. Please review the [ASU Days Off](#) for more details.

Module: Title	Begins at 12:01 AM Arizona (AZ) Time	Ends at 11:59 PM Arizona (AZ) Time
Orientation and Onboarding Review You must complete required tasks in the Orientation and Onboarding Review for Module 0: Welcome and Start Here to be unlocked.	March 07, 2024	March 10, 2024
Module 0: Welcome and Start Here	March 07, 2024	March 11, 2024

You must complete required tasks in Module 0: Welcome and Start Here for the rest of the course to be unlocked.		
Module 1: Blockchain's Abstractions and Applications	March 11, 2024	March 17, 2024
Module 2: Hash Functions	March 18, 2024	March 24, 2024
Module 3: Cryptographic and Mathematical Foundations of the Blockchain	March 25, 2024	March 31, 2024
Module 4: Transactions on the Blockchain	April 01, 2024	April 07, 2024
Module 5: Mining	April 08, 2024	April 14, 2024
Module 6: Blockchain Consensus	April 15, 2024	April 21, 2024
Course Evaluation You may also refer to ASU's Office of Evaluation and Educational Effectiveness (UOEFE) for dates.	April 15, 2024	April 25, 2024
Module 7: Governance	April 22, 2024	April 28, 2024
Module 8: Peer-Peer Networks (Optional)	April 22, 2024	April 28, 2024
Deadline to Submit all Graded Coursework	Not applicable	April 28, 2024
Final Exam	April 28, 2024	May 04, 2024
Request for Faculty Review: MCS Portfolio Project Report Inclusion Request Optional, degree-seeking learner degree requirement If you submit by the first deadline and it is not accepted, you are encouraged to review the feedback and re-submit it a second time by the last submission deadline. Anything submitted past the last submission deadline will not be reviewed for approval in your portfolio to meet your degree requirements. You will have to repeat this process for another course and a project from that course.	April 28, 2024	First submission deadline by: May 10, 2024 Last submission deadline (if necessary) by May 20, 2024

Faculty Feedback for the Review: MCS Portfolio Project Report Inclusion Request Optional, degree-seeking learner degree requirement	May 10, 2024	June 3, 2024
Course Closes Once the course closes, you will no longer be able to access coursework you have submitted, so please download copies of what you would like from the course (e.g., Request for Faculty Review: MCS Portfolio Project Report Inclusion Request)		June 17, 2024

Grades are due May 6, 2024. Please see the [ASU Academic Calendar](#) for additional information.

Late or Missed Coursework

When possible, kindly notify the instructor before a coursework deadline by creating a private thread in Ed.

If an urgent situation or emergency arises and you are unable to submit the assignment on time, please send the instructor a private thread on Ed as soon as you are able to.

Follow the appropriate University policies to request an [accommodation for religious practices](#) or to accommodate a missed assignment [due to University-sanctioned activities](#).

Coursework Due Dates and Late Penalties

Unless otherwise noted, all coursework is due on **Sundays at 11:59 PM Arizona (AZ) time**. Assignment due dates follow Arizona Standard time. Use a [Time Converter](#) to ensure you account for the difference in time zones. Arizona does **not** observe daylight savings time.

Review specific due dates directly in your course. For learners with accommodations through [Student Accessibility and Inclusive Learning Services \(SAILS\)](#) and/or the [Pat Tillman Veterans Center \(PTVC\)](#), please work with your SAILS consultant and/or PTVC Advocacy Team, Connect, and your instructor.

This course has a designated deadline to submit all graded coursework. This deadline means graded coursework submitted after the date, will not be evaluated and result in a grade of zero (0) points. Please review the Course Schedule and Important Dates section.

Graded Discussion Prompts

An automatic late penalty of 100% is applied after the scheduled due date and time.

- **Module 1 Interest Area Graded Discussion Prompt**
- **Module 1 Navigating Resources Graded Discussion Prompt**
- **Module 2 Interest Area Graded Discussion Prompt**
- **Module 2 Navigating Resources Graded Discussion Prompt**
- **Module 3 Interest Area Graded Discussion Prompt**
- **Module 3 Navigating Resources Graded Discussion Prompt**
- **Module 5 Interest Area Graded Discussion Prompt**
- **Module 5 Navigating Resources Graded Discussion Prompt**
- **Module 6 Interest Area Graded Discussion Prompt**
- **Module 6 Navigating Resources Graded Discussion Prompt**
- **Module 7 Interest Area Graded Discussion Prompt**
- **Module 7 Navigating Resources Graded Discussion Prompt**

Graded Quizzes

An automatic late penalty of 100% is applied after the scheduled due date and time.

- **Module 1 Graded Quiz**
- **Module 2 Graded Quiz**
- **Module 4 Graded Quiz**
- **Module 5 Graded Quiz**
- **Module 6 Graded Quiz**
- **Module 7 Graded Quiz**

Projects

A 5% automatic deduction per day is applied after the scheduled due date and time.

- **Creating an ERC-721 Token Standard Smart Contract on Ethereum Project**
- **Hyperledger Fabric Private Blockchain and Chaincodes Project**

Exams

An automatic late penalty of 100% is applied after the scheduled due date and time.

- **Final Exam**

Optional Extra Credit

No late penalty is applied after the scheduled due date and time.

- **(Optional) Blockchain Research Area Exploration Assignment**

Course Content

Each course in the MCS program is uniquely designed by expert faculty, so learners can best master the learning outcomes. As a result, course features and experiences are not the same across all MCS courses. Learners are expected to plan accordingly to accommodate for these differences.

Content and Assessment Details

If you have specific questions related to instructional and assessment items in this course that you would like to be considered to be addressed in the Zoom event hosted by the instructor, please clearly indicate your request in your Ed Discussion thread.

PlayPosit Lecture Playlists

The course content is presented through a collection of Playposit Playlists embedded in each module. Playposit is a video platform that prompts interaction and note-taking while viewing course content. The playlists launch automatically and you can playback the course content by selecting the video titles in the playlist. The videos can be rewatched, but playlist videos cannot be downloaded. The playlist pages will include the downloadable video transcripts and any applicable supplementary material. Other course materials that accompany the lectures will be found in the media guides.

A media guide is included at the beginning of each module in the Overview section. These guides are designed to give you a snapshot description of each module's media components and to provide PDF

lecture slides or note-taking materials where available, so you can plan your learning and quickly go back and review material as you prepare for your coursework.

Overview videos and project-related videos do not have PDF lecture slides because they are not lectures and have associated documents specific to them. The interview videos build context for the course and do **not** have PDF slides.

Playposit Interactions: Knowledge Checks

Playposit provides opportunities for interaction and reflection as you learn the course content. After lecture videos there are interactions called knowledge checks. Interactions are designed to support your learning, highlight specific content, encourage active viewing and/or note-taking and provide practice opportunities. They are untimed, ungraded learning opportunities to test your knowledge of the concepts presented during the lecture videos. You may retake these as often as you would like at any point in the course.

You can toggle the clipboard icon on the left of the screen and select a review to see all the questions. You are accountable for this information as it may be assessed in different ways in other graded coursework.

There are no late penalties. Interactions are not counted toward your final grade in the class.

Readings

Suggested readings may accompany topics. They are supplementary or enrichment materials for you to further understand the course topics.

Discussions

Ed Discussion

Ed Discussion (Ed) is being used in place of Canvas Discussion Forums. The purpose of Ed Discussion is to provide a place for learners to ask questions and receive answers from course staff and peers about course content and coursework. The course team is engaged in discussions, but it is also a space to clarify, support, and enrich learner-to-learner communication and learning. There are designated categories for course items. You must select a category and subcategory to start a thread.

Discussions in Ed are designed to provide:

- Clarification
- Feedback

- Enrichment and deeper learning
- Connections between concepts or key ideas
- Reflection opportunities of real-world experiences
- Respectful debate and perspective building
- Resource sharing
- Networking

There are no late penalties. Ed is not counted toward your final grade in the course.

Designated Project Discussion in Ed Discussion

Use Ed to discuss items relating to the course projects. Questions/Threads should be categorized by their designated title in Ed. Please check for questions already asked and answered, or marked as resolved.

There are no late penalties. Responses in Ed are not counted toward your final grade in the course.

Graded Discussion Prompts in Canvas

Modules 1-3 and 5-7 include two (2) graded discussion prompts for a total of twelve (12) graded discussion prompts in the course. Each prompt provides a space for you to respond. After responding, you can see and comment on your peers' responses. Follow the directions in your course prior to posting.

Review the grading criteria in the rubric directly in the course for how your responses will be assessed. Graded discussion prompts and your responses to peers are counted toward your final grade in the class.

Practice Quizzes

There is a practice quiz to help prepare you for each graded quiz. You may retake these as often as you like at any point in the course. You are encouraged to read the feedback, review your answer choices, and compare them to the correct answers. With the feedback as your guide, you may use these as opportunities to study for other assessments and tasks in the course.

There are no late penalties. Practice quizzes are not counted toward your final grade in the class.

Graded Quizzes

Modules 1, 2, and 4 - 7 each include one (1) graded quiz for a total of six (6) graded quizzes in the course. Each graded quiz includes eight to ten (8 - 10) single answer multiple-choice questions. You

will be allowed one (1) attempt for each of these quizzes. There is a time limit of sixty (60) minutes to complete each graded quiz. Once you open a graded quiz, the timer will start and you are to complete the graded quiz in a single session. Graded quizzes in this course include no feedback and do not include the incorrect and correct answers. Read the Graded Quiz and Exam Policy for your course for more information.

An automatic late penalty of 100% is applied after the scheduled due date and time. Five (5) of the six (6) quizzes count toward your final grade in the class. The lowest scoring one (1) quiz is automatically dropped from your grade.

Individual Projects

This course includes two (2) individual projects. All project overview documents and materials are provided in the *Welcome and Start Here* section of your course, so you can preview what is expected and design your own learning schedules to complete these on time. Review the "Request for Faculty Review: MCS Portfolio Project Report Inclusion Request" section of this syllabus for what can be used from this course to potentially meet the degree portfolio requirement, which is optional and for degree-seeking learners only.

A 5% automatic deduction per day is applied after the scheduled due date and time. These projects count toward your final grade in the class.

Gradescope

All projects for this course will use Gradescope. You must complete your work locally and then submit it in Gradescope. Carefully review submission directions outlined in the project overview documents in order to correctly earn credit.

Request for Faculty Review: MCS Portfolio Project Report Inclusion Request

This is an optional task for degree students wanting to use this course's project(s) as part of their portfolio degree requirement/specialization requirements. Review your onboarding course and the Welcome and Start Here section of your course for more details. The submission space is towards the end of the course.

Your Request for Faculty Review: MCS Portfolio Project Report Inclusion Request will be evaluated only if the criteria is met (see your MCS Handbook for more details):

- Your course is designated as a portfolio eligible course
- You address the designated project(s), which equal 30% or more of your overall course grade
- Your final course letter grade of a B* or higher

*Degree-seeking students with course letter grades that are lower than a B will not have their submissions reviewed.

Although there are no late penalties, these requests must be submitted by the designated deadlines. The Request for Faculty Review: MCS Portfolio Project Report Inclusion Request does not count toward your final grade in the class.

Address these projects in your Request for Faculty Review: MCS Portfolio Project Report Inclusion Request:

- Creating an ERC-721 Token Standard Smart Contract on Ethereum Project
- Hyperledger Fabric Private Blockchain and Chaincodes Project

Optional Extra Credit

The Blockchain Research Area Exploration is an optional extra credit opportunity. The overview document is provided in the *Welcome and Start Here* section of your course so you can preview what is expected.

There are no late penalties. If completed and submitted, you may receive additional points toward increasing your overall grade in the class.

Practice Exam

In order to help you prepare for your proctored exam, you will have a practice exam. Since it is intended to be a practice opportunity and to help you learn, you have unlimited attempts and it is untimed, ungraded, and includes feedback.

Honorlock will be enabled for your practice exam, but will be set to “simulated - not proctored” so you will not be recorded or flagged for actions performed while taking it. Treat this as a technology check to confirm that your system will work as expected.

You may engage with your peers in Ed Discussion to address questions, share resources and strategies, and provide feedback to help one another learn. You are encouraged to read the feedback, review your answer choices, and compare them to the correct answers. You are encouraged to submit questions in Ed Discussion for the course team to address during Zoom Events and/or Zoom Support Sessions. Use the feedback to guide your learning and to study for the proctored exam.

There are no late penalties. Practice exams are not counted toward your final grade in the class.

Proctored Exam

You have one (1) proctored exam. This consists of a Final Exam. The proctored exam does not include feedback. Read the Graded Quiz and Exam Policy for your course for more information.

No late exams will be permitted or accepted and will result in a score of zero (0) points. This does not include established accommodations for learners receiving accommodations through [Student Accessibility and Inclusive Learning Services \(SAILS\)](#) and and/or the [Pat Tillman Veterans Center \(PTVC\)](#).

The proctored exam counts toward your final grade in the class.

Exam Details	Final Exam
Content Covered	Modules 1, 2, 3, 4, 5, 6, and 7
Question Type	Single answer multiple choice
Number of Questions	22 total questions (21 content questions + 1 academic integrity question)
Availability Start	Sunday, April 28, 2024 at 12:01 AM AZ Time
Availability End	Saturday, May 04, 2024 at 11:59 PM AZ Time
Scheduling Reminder In order to have enough time to complete the exam, you should start your exam no later than the listed date and time to ensure you have enough time to complete it before the due date.	Saturday, May 04, 2024 at 9:01 PM AZ Time
Duration	120 minutes + plan for at least 15 minutes for proctoring set up

Proctoring

Honorlock will proctor your exam this semester. Honorlock is an online proctoring service. You do **not** need to create an account or schedule an appointment in advance. Honorlock is available twenty-four hours a day and seven days a week (24 hours/7 days), and all that is required is a computer, a working webcam/microphone, your ID, and a stable internet connection.

Review your onboarding course and the *Welcome and Start Here* section in your course for more information about Honorlock and how to download the required Chrome Extension.

Exam Name Allowances

Learners needing accommodations need work through the [Student Accessibility and Inclusive Learning Services \(SAILS\)](#) and/or the [Pat Tillman Veterans Center \(PTVC\)](#).

Any items not included in this list are **not** allowed during the exam or in your exam space.

Reminders

- You are to independently take your exam in a single session. Once you open your exam, your testing session begins and you will need to complete it within the allotted time. Your exam will automatically be submitted if it is not completed before the deadline. You will be allowed one (1) attempt to take and complete your exam.
- You are to independently take the exam in a single session without leaving the testing space (e.g., no bathroom breaks) to ensure proctoring of the entire session.
- You are to stay within a clear view of the webcam throughout the duration of the proctored exam session,
- Before the exam concludes and the proctoring session ends, all scratch paper must be destroyed and all whiteboard markings must be erased.
- The last question in the exam will be a confirmation of you upholding ASU academic integrity.

Specific Allowances

- **Site URLs:** Yes
 - Pre-approved website: [Desmos | Scientific Calculator](#)
- **Open book:** No

- **Pre-written paper notes:** No
- **Scratch paper:** Yes
 - Unlimited amount of blank scratch paper of any size, writing utensils (e.g., pens, pencils, markers, and/or highlighters) and erasers; please have extra ones in your testing area should you run out of ink, the pencil breaks, etc.
 - Before the exam concludes and the proctoring session ends, all scratch paper must be destroyed and all whiteboard markings must be erased. The last question in the exam will be a confirmation of learners executing these ASU academic integrity actions.
- **Handheld calculator:** Yes
 - Not a separate device's calculator (e.g., mobile/cell phone) or anything with Internet access.
 - Scientific Calculator
- **On-Screen Calculator:** Yes
 - Honorlock provided scientific calculator
 - Online calculator: [Desmos | Scientific Calculator](#)
- **Restroom breaks:** No
- **Copy and Paste:** No
- **Hats:** No
- **Headphones:** No
- **Take Exam in a Public Area:** No
- **Mobile Phone Use:** No
- **Background Noise (Occasional sounds expected in the testing area):** No

Course Grade Breakdown

Course Work	Quantity	Team or Individual	Points
Graded Discussion Prompts	12	Individual	360
Graded Quizzes Five (5) of the six (6) quizzes count toward your final grade in the class. The lowest scoring one (1) quiz is automatically dropped from your grade.	6	Individual	120

Creating an ERC-721 Token Standard Smart Contract on Ethereum Project*	1	Individual	210
Hyperledger Fabric Private Blockchain and Chaincodes Project*	1	Individual	210
Final Exam	1	Individual	100
Total Course Points			1000

*The project(s) count for 30% or more of the overall course grade, so this is a portfolio eligible course. See the [MCS Graduate Handbook](#) for more information about the portfolio requirement if you are a degree student.

Grade Scale

You must earn a cumulative grade of 70% to earn a “C” in this course. You must earn at least a “C” to receive graduate credit. This course has no grade curving. Six (5) of the six (6) quizzes count toward your final grade in the class. The lowest scoring one (1) quiz is automatically dropped from your grade. Grades will be rounded. Grades in this course will include pluses or minuses.

The instructor reserves the right to adjust individual grades based on, but not limited to: violations of academic integrity.

Range of Points	Percentage	Letter Grade
970 - 1000	97 - 100	A+
930 - 969.99	93 - 96.99	A
900 - 929.99	90 - 92.99	A-
870 - 899.99	87 - 89.99	B+
830 - 869.99	83 - 86.99	B
800 - 829.99	80 - 82.99	B-

770 - 799.99	77 - 79.99	C+
700 - 769.99	70 - 76.99	C
600 - 699.99	60 - 69.99	D
0 - 599.99	0 - 59.99	E

Zoom Meetings

This course has three (3) types of Zoom meetings:

- Instructor Zoom Events
- Instructional Assistant (IA) Zoom Support Sessions
- Grader Zoom Support Sessions

Check the Zoom tab in the navigation menu of your course. Although we try to be consistent for our learners' planning purposes, the schedule is subject to change throughout the course, so stay up-to-date on the event details by checking your Ed and course announcements.

Read about the specific policies related to Zoom meetings directly in your onboarding course and your course pages: Syllabus, ASU Course Policies, and any additional course-specific policy information in the Welcome and Start Here area. Additional information may be included in the Policies section of this syllabus. You are responsible for adhering to all policies.

Instructor Zoom Events will be recorded and shared through the "Zoom" navigation link in your course. These can be found by going to the "Cloud Recordings" tab. These recordings will be unavailable after 120 days.

Policies

For ASU, FSE, and MCS policies, review your onboarding course and read the ASU Online Course Policies in your course's navigation menu.

This section refers to course-specific policies. Please refer to the ASU Course Policies section in your course, your onboarding course, and the Welcome and Start Here section of your course in addition to the policies listed in this section.

Use of Generative AI

No Generative AI Use Permitted

In this course, all assignments must be completed by the student. Artificial Intelligence (AI), including ChatGPT and other related tools used for creating of text, images, computer code, audio, or other media, are not permitted for use in any work in this class. Use of these generative AI tools will be considered a violation of the [ASU Academic Integrity Policy](#), and students may be sanctioned for confirmed, non-allowable use in this course.

Graded Quiz and Exam Policy

Each course in the MCS program is uniquely designed by expert faculty so that learners can best master the learning outcomes specific to each course. By design, course features and experiences are different across all MCS courses.

In the MCS program, we strive to provide learners with exercises and applied practice beyond quizzes and exams that align with the hands-on nature of the computer science industry. Ungraded practice opportunities may include, but are not limited to: in-video-questions (IVQs), knowledge check quizzes (KCs), module practice quizzes, practice exams, and other coursework. When available, the questions and correct answers are provided to learners. Depending on the type of questions, auto-generated feedback is built into the course to further help learners learn in real-time. Please thoroughly review your course to ensure that you are aware of the types of practice opportunities available to you.

For academic integrity purposes, once grades are made available, learners will see their overall total scores. Like other standardized tests, such as the GRE and SAT, learners will receive a singular grade for the graded quizzes and exams, but the questions, correct and incorrect answers, and feedback to each question will **not** be provided.

If learners desire 1:1 feedback, please send a private thread to the course team on Ed and/or attend a Zoom session with the course team. Rather than receiving the exact questions learners had correct and incorrect and the answers to those questions, learners will likely receive the concepts that were covered in the assessment questions, so they will know what they need to review prior to other assessments and how to apply this information in their professional environments.

Disclaimer

The information in this syllabus may be subject to change without advance notice. Stay informed by checking course announcements and the syllabus section of your course.

Course Creators

Dragan Boscovic



Dragan Boscovic, Ph.D, is a research professor in the School of Computing and Augmented Intelligence (SCAI), as well as a co-director for the Center for Assured and Scalable Data Engineering (CASCADE). Dr. Boscovic also leads Arizona State University (ASU)'s Arizona Blockchain Applied Research Center (AZBARC) as a research director where their mission is to develop practical blockchain solutions, assist with the positive transformation of industries and societies, and educate the next generation of thought leaders beyond their current state of art.

He holds a bachelor's degree in Electronics and Computer Science (1983) and a doctorate in Optoelectronics (1988) from the University of Belgrade, Serbia. In addition, he has a doctorate in Numerical Electromagnetics from the University of Bath, United Kingdom (1991). With over 30 years of industry experience and senior technology expertise in a global context, Dr. Bosovic has developed and run multiple technology operations in countries such as the United Kingdom, France, China, and the United States, installing collaboration and open communication as organizational cornerstones. He has expanded exposure to multiple information and communication technologies and systems, of which he leads a consortium of four private companies that bring together their Security, wireless SDN, BigData Analytics and Interactive Video solutions, competencies, and technology enablers to jointly address new business opportunities.

Darren Tapp



Darren Tapp, Ph.D, was a research assistant professor in the School of Computing and Augmented Intelligence (SCAI) and involved in the development of Bitcoin. Tapp was also a researcher on the digital cash (cryptocurrency) development team at dash.org, a non-profit blockchain technology startup. He earned his doctorate in mathematics from Purdue University in 2007. He also holds a bachelor's degree in physics and a bachelor's and master's degree in mathematics from the University of Kentucky. Most recently, he has taught both on-ground and online at schools including Southern New Hampshire University, NHTI - Concord's Community College, and Hesser College. He lives in New Hampshire, where he volunteers promoting STEM subjects to high-school-aged members of the Big Fish Learning Community.

Swathi Punathumkandi



Swathi Punathumkandi, Ph.D., is an assistant teaching professor in the School of Computing and Augmented Intelligence (SCAI) at Arizona State University (ASU). She earned her Ph.D. from the National Institute of Technology, Karnataka in India in 2022 and then joined SCAI the same year. She pursued her Master's degree in Computer Science from the National Institute of Technology, Goa, and her bachelors degree in Information Technology from Government Engineering College,

Bartonhill, Thiruvananthapuram. She has made several contrib journal publications relating to blockchain, the most recent titled “Is Data Science and Blockchain a Perfect Match?” published in 2022. Her research interests span in the areas of blockchain, which include industrial applications of Blockchain, Performance evaluation of various blockchain platforms, Blockchain in Sustainability, and Hyperledger Fabric and Ethereum.