Ron Fulbright

Education

Ph.D. in Computer Engineering	University of South Carolina	May 2002
M.E. in Computer Engineering	University of South Carolina	May 1992
B.S. in Computer Engineering	Clemson University	August 1982

Professional Experience Summary (Detail provided below)

- University of South Carolina Upstate, Chair — 2024-present
  Chair of the Department of Informatics & Engineering Systems and the six degree programs contained within it: Advanced Manufacturing Management (AMM), Engineering Technology Management (ETM), Health Informatics (HI), Health Information Management (HIM), Information Technology (IT), Industrial Engineering (IE), and the Master of Science in Informatics. I am overseeing the addition of a new undergraduate program, the BS in Industrial Engineering and the renaming of the BA in IMS degree to the BA in Information Technology (IT).
- University of South Carolina Upstate, Coordinator-IES Graduate Program — 2012-present
  Oversee curriculum development, student recruiting/mentoring and advising as well as conduct independent research with graduate students in innovation and cognitive systems.
- University of South Carolina Upstate, Professor — 2014-present
  Teach 8-10 courses per year, including summer offerings, in cognitive systems, innovation, and senior seminar, serve on up to two standing committees, and advise 30-40 students per semester both at the undergraduate and graduate level.
- University of South Carolina Upstate, Chair — 2004-2018
  Chair of the Department of Informatics (now called the Department of Informatics & Engineering Systems) since its inception in 2004. I oversaw the creation of two undergraduate programs (BA in Information Management & Systems and the BA in Health Informatics) and a graduate program (the MS in Informatics). I hired and mentored over twenty full-time and part-time faculty for the Department including seven tenured or tenure-track faculty and over a dozen instructors or adjuncts. In the administration of the Department, I performed over 5,000 service actions per year including managing and supervising all staff and faculty assigned to the Department. I taught 5-6 classes a year, advised 50-75 students personally, evaluated each of 30-40 applications for degree per year, performed transfer evaluations of 50-100 students per year, handled all recruiting duties for the Department both in Spartanburg and in Greenville, and received excellent ratings on student opinion polls. I managed the annual budget for the Department (in excess of one million dollars) and came in under budget each year as Chair. I also completed the requirements for promotion and tenure, being promoted to full professor in 2014. I am intimately involved in the development of the campus-wide policies and governance of graduate studies at USC Upstate. Key roles and ranks:

Professor with Tenure	2014- present
Associate Professor with Tenure	2008 - 2014
Assistant Professor	2003 - 2008
Chair, Department of Informatics, University of South Carolina Upstate	2004 - 2018
Chair, Department of Informatics Graduate Committee	2012 - present
Chair, Distance Learning Task Force	2010
Member, Graduate Studies Ad Hoc Committee	2011- 2015
Member, Greenville Strategy Ad Hoc Committee	2012 - 2013
Member, UCG Management Task Force	2014 - 2015
Director, Center for Information Management & Systems, USC Upstate	2003 - 2004

Teaching (2014-present)

Courses Taught

Note: Graduate courses are **bold** and count 1.5 teaching units, online courses are in *italics*, enrollment is in parentheses.
Note: INFO 498 is scheduled as needed for students doing an internship and is not counted as a teaching unit.
Note: INFO 798/799 (independent research) for graduate students counts 1.5 teaching units if enrollment is 3 or more.

2014 – 2015 [6.5 teaching units] *(2/2 teaching load as Chair of the department)*
Summer: INFO 498(5); **INFO 799(3)**
Fall: INFO 305 (23); *INFO 305-02W (21)*; INFO 307 (22); INFO 498 (1); **INFO 798 (1)**
Spring: INFO 305 (24); INFO 307 (23); INFO 498 (3); INFO 499 (2); **INFO 798 (3)**

2015 – 2016 [11 teaching units] *(2/2 teaching load as Chair of the department)*
Summer: INFO 498 (4); **INFO 710 (11); INFO 760 (9)**
Fall: INFO 305 (30); INFO 307 (26); INFO 498 (1); *INFO 499 (18)*; **INFO 798 (3)**
Spring: *INFO 201 (24)*; INFO 305 (15); *INFO 305 (12)*; INFO 307 (21); *INFO 307 (16)*; INFO 498 (2); INFO 499 (1); **INFO 798 (5)**

2016 – 2017 [8.5 teaching units] *(2/2 teaching load as Chair of the department)*
Summer: *INFO 496 (1)*; INFO 498 (3); ***INFO 796 (6)***
Fall: INFO 305 (28); INFO 307 (25); INFO 498 (5); *INFO 499 (3)*; **INFO 740 (12)**; **INFO 798 (3)**
Spring: INFO 305 (29); INFO 307 (21); INFO 496 (1); **INFO 710 (5)**; **INFO 798 (2)**

2017 – 2018 [8.5 teaching units] *(2/2 teaching load as of the department)*
Summer: *INFO 305 (18)*; *INFO 307 (15)*; INFO 498 (6); **INFO 798 (2)**
Fall: INFO 305 (24); INFO 307 (24); *INFO 499 (7)*; **INFO 760 (8)**; **INFO 798 (1)**
Spring: INFO 307 (23); INFO 498 (1); **INFO 740 (3)**; **INFO 798 (3)**

2018 – 2019 [9 teaching units] *(4/4 teaching load as a tenured professor)*
Summer: *INFO 307 (23)*; INFO 498 (1); ***INFO 710 (5)***
Fall: INFO 307 (25); INFO 498 (4); INFO 499 (6); *INFO 499 (8)*; **INFO 720 (8)**
Spring: INFO 307 (19); *INFO 496 (13)*; INFO 499 (4); **INFO 740 (7)**; **INFO 798 (1)**

2019 – 2020 [8.5 teaching units] *(4/4 teaching load as a tenured professor)*
Summer: *INFO 307 (21)*; ***INFO 710 (5)*****; *INFO 798 (1)***
Fall: INFO 307 (15); INFO 499 (6); **INFO 720 (4)**; **INFO 798 (4)**
Spring: INFO 307 (19); INFO 498 (1); INFO 499 (12); **INFO 796 (5)**; **INFO 798 (1)**

2020 – 2021 [8 teaching units] *(4/4 teaching load as a tenured professor)*
Summer: *INFO 307 (22)*; ***INFO 740 (3)***
Fall: INFO 307 (8+*8v*); INFO 430 (7+*1v*); INFO 499 (9+*1v*); **INFO 798 (2)**
Spring: INFO 307 (5+*8v*); INFO 499 (4 + *6v*); **INFO 798 (4)**

2021 – 2022 [8 teaching units] *(4/4 teaching load as a tenured professor)*
Summer: *INFO 307 (23)*; ***INFO 710 (5)*****; INFO 798 (2)**
Fall: INFO 307 (15+*4v*); INFO 430 (11); INFO 499 (12); **INFO 740 (5)**
Spring: INFO 307 (9+*13v*); INFO 499 (9); **INFO 798 (3)**

2022 – 2023 [8.5 teaching units] *(4/4 teaching load as a tenured professor)*
Summer: *INFO 307 (20)*; **INFO 798 (2)**
Fall: INFO 307 (15); INFO 430 (9); INFO 499 (10); **INFO 740 (8)**
Spring: INFO 307 (24); INFO 499 (17); **INFO 710 (13); INFO 798 (1)**

2023 – 2024 [8.5 teaching units] *(4/4 teaching load as a tenured professor)*
Summer: *INFO 307 (8)*; **INFO 798 (3)**
Fall: INFO 307 (16); INFO 430 (17); INFO 499 (8); **INFO 798 (3)**
Spring: INFO 307 (14); INFO 499 (14); **INFO 740 (9); INFO 798 (3)**

2024 – 2025 [8.5 teaching units] *(2/2 teaching load as chair)*
Summer: **INFO 798 (3)**
Fall: INFO 307 (21); INFO 430 (21); **INFO 798 (4)**
Spring: INFO 307 (24); **INFO 710 (23); INFO 798 (1)**

New Courses Developed (Unit Criteria Ranking: Most Highly Valued)
1. INFO 465: Artificial Intelligence Fundamentals
2. INFO 435: Using AI Agents
3. INFO 430: Intelligent Systems
4. INFO 740: Cognitive Systems
5. INFO 765: Applied Artificial Intelligence
6. INFO 735: Applied AI Agents
7. INFO 710: Management of Innovation & Intellectual Property
8. INFO 720: Information Architecture

Redesigned Courses (Unit Criteria Ranking: Most Highly Valued)
1. INFO 499: Senior Seminar
2. INFO 305: Social Informatics

Undergraduate Students Mentored (Unit Criteria Ranking: Most Highly Valued)

1. Royston McKaig	Augmented, Mixed, and Enhanced Reality (Lois)	2020
2. Grace Vaughan	Activity Recognition (Lois)	2020

Graduate Students Mentored (Unit Criteria Ranking: Most Highly Valued)

1. Tejaswi Myeni	AI Components for an Interactive Memory Book	Sp 2025
2. Jared Keklak	AI Components for an Interactive Memory Book	Fa 2024
3. Phong Le	AI Components for an Interactive Memory Book	Fa 2024
4. Timothy Rhymer	AI Components for an Interactive Memory Book	Fa 2024
5. Jake Stavrakas	Incorporating Scam Protection for the Elderly (Lois)	Sp 2024
6. Kristina Lashchuk	Multi-Level Coordination in Disaster Response	Sp 2024
7. Sean Brown	Building a Chatbot as an Elderly Companion	Sp 2024
8. Andrew Gung	Synthetic Expertise in Disaster Response	Fa 2023
9. Miranda Morrison	Does ChatGPT Augment Human Cognitive Ability?	Su-Fa 2023
10. Kelly Rhoden	Integrating Definitive Healthcare with Salesforce	Su-Fa 2023
11. Georgia McClintock	National Survey of Student Engagement	Su 2023
12. Shanyia Grant	A Cognitive Companion for Vision Impaired Elderly	2021-2022
13. Keianna Spencer	A Cognitive Companion for Vision Impaired Elderly	2021-2022
14. Samuel McGaha	Augmenting Human Cognition Using Cognitive Systems	2021-2022
15. Nariman Abushanab	Design Changes to a Synthetic Elderly Companion	2020-2021
16. Elizabeth Sullivan	Communicating with an Elderly Cognitive Companion	2020-2021
17. Dane Jordan	Superhuman Diagnostic Capability in a Synthetic Companion	2019-2020
18. Karl Riley	Dialoging with a Cognitive System in a Home Environment	2019-2020
19. Ashley Rowland	Dialoging with a Cognitive System in Mixed Reality	2019-2020
20. Keith Hansen	Combining Six Sigma and I-TRIZ	2019
21. Steve Stanton	Expertise and Companions	2018-2019
22. Kristen Good	SeniorMate: A Cognitive System Companion for the Elderly	2018-2019
23. Christina Biggerstaff	Front-Ending Scenario Planning with Jobs Theory	2018-2019

24.	Jason Kruczynski	Front-Ending Scenario Planning with Jobs Theory	2017-2018
25.	Joseph Hughes	I-TRIZ in K-12	2017-2018
26.	Christopher Taggart	Innovation Assurance using BACUP and Jobs Theory	2016-2017
27.	Mingwen Zheng	SC Population Health Analysis Using IBM Watson Analytics	2016-2017
28.	Robert Nielson	Communicating Cognitive Systems	2016-2017
29.	Jefferson Holland	Communicating Cognitive Systems	2014-2015
30.	Travis Gause	Survey of Cog-Like Systems	2014-2015
31.	Ronald Patane	Air Pollution, Temperature & Respiratory Diseases in Beijing	2014-2015
32.	Marsha Jordan	Direct Evolution for Union County	2014-2015
33.	Jiaxin Li	Internship at Advance America	2014-2015
34.	William Lowder	Innovation Assurance using BACUP and Jobs Theory	2014-2015

Service (2014-present)

Campus

- Coordinator Informatics & Engineering Systems Graduate Program 2012-present
  - Working on getting the CIP code changed to a STEM code
  - Requested "online" status for the graduate program
  - Pursued the "India Cohort" (evaluated over 50 applications)
  - Oversaw changes to the graduate program and internal approval of same
    - Requiring only one independent study course
    - Creation of a cybersecurity focus area
    - Creation of a business analytics focus area (in collaboration with JCBE)
  - Completed the revised catalog entries and associated paperwork
  - Oversaw the creation of a new graduate course (INFO 717) in cybersecurity
  - Advised all graduate students for 2022 and 2023 (as coordinator of I&ES graduate program)
  - Advised most graduate students for 2014 – 2021 (as Chair of I&ES and professor)
- Greenville Committee (future of programs in Greenville) 2021-2022
- Tables and Technology Committee (C&W replacement) 2021-2023
- Chair, Peer Review Committee 2018-present
  - Resulting in promotion/tenure for Dr. Breaux Fa 2023
  - Resulting in promotion/tenure for Dr. Egbue Fa 2023
  - Resulting in promotion/tenure for Dr. Katina Fa 2023
  - Resulting in promotion/tenure for Dr. Adebiaye Fa 2022
  - 3rd-yr review for Dr. Adebiaye Fa 2021
  - 3rd-yr review for Dr. Norris Fa 2021
  - 3rd-yr review for Dr. Katina Fa 2021
- Faculty Welfare Committee 2020-2023
- Graduate Committee 2018-2019
- Graduate Committee 2023-2024
- Expanded Academic Affairs Council (monthly) 2014-2018
- College of Arts & Sciences Chairs and Directors Meeting (monthly) 2014-2018
- Chair and Director of Graduate Program, Department of Informatics 2014-2018
- Fabulous Friday Events (several recruiting events per semester) 2014-2018
- Open House Recruiting Events (several Saturdays) 2014-2018
- Transfer and Freshman OARs (every semester and summer) 2014-2018
- Direct Connect Orientation (every semester and summer 2014-2018
- Business After Hours (UCG) 2017
- Greenville Campus Planning Committee 2016
- Palmetto College 2016-2017
- Return to Learn 2015-2016
- Distance Education Task Force 2015

- Opportunity Fair, UCG 2014-2015
- Leadership Retreat 2015
- Greenville Leadership 2014
- Landshut Dual Degree Program 2014-2015
- UCG College Fair 2014
- UCG Marketing 2014

Professional

- Mentor to entrepreneurial startups with American Technology Venture Lab 2024-present
- ISO 56000 committee drafting the standards for innovation management 2019-present
  Involves weekly editing meetings lasting 2-3 hours each as well as researching and writing content for the emerging standard outside of the editing meetings.
- Lead, US Technical Advisory Group (TAG) 279 for the ISO 56000 2020-present
  Involves monthly meetings, assimilating comments from others in the United States (US), and representing the US concerns in deliberations and editing sessions
- Reviewer, Human Factors in Computing Systems (CHI 2023) November 2022
- Reviewer, *International Journal of Innovation Science* February 2022
- Reviewer, *International Journal of Systems Engineering* November 2021
- Session Organizer/Moderator, HCI International Conference (HCI 2020) July 2020
- Reviewer, *International Journal of Innovation Science* July 2020
- Reviewer, *International Journal of Innovation Science* June 2019
- Reviewer, *International Journal of Innovation Science* May 2019
- Reviewer, *International Journal of Innovation Science* Dec 2018
- Reviewer, *International Journal of Innovation Science* Sep 2017
- Reviewer, *International Journal of Innovation Science* Aug 2017
- Reviewer, *International Journal of Innovation Science* June 2017
- Reviewer, *International Journal of Innovation Science* May 2017
- Reviewer, *International Journal of Innovation Science* Jan 2017
- Reviewer, *International Journal of Innovation Science* May 2016
- Reviewer, *International Journal of Innovation Science* May 2015
- Computer Science Advisory Committee (GTC) 2014-2017
- Spartanburg County Foundation Technical Advisory Committee 2016
- Landshut University (Germany), visiting professor 2015
- Career Night (GTC) 2014
- Care.IT, Inc. (mentor to startup) 2014
- American Society for Training & Development (guest speaker) 2014

Scholarship (2014-present)

Books

1. Fulbright, R. (2020). *Democratization of Expertise: How Cognitive Systems Will Revolutionize Your Life* (1st ed.), CRC Press, Boca Raton, FL., 2020. ISBN-13: 978-0367859459.
2. Fulbright, R. (2019). *Knowledge-Based Innovation: Ideation with I-TRIZ Operators,* Lulu, 2019

Patents Awarded

1. US 11,565,813. Swarm-Based Firefighting Drone and Mass Aerial Drop System and Method. 2023
2. US 11,912,285. Vehicular Passenger Monitoring System 2024
3. US 12,145,768. Nestable Bottle 2024

Upstate Research Symposium (student mentoring/research projects)

1. Fulbright, R. (2020a). Human Cognitive Augmentation in Human/Cog Synthetic Expertise Ensembles, *Proceedings of the Annual USC Upstate Research Symposium*, 2020.
2. Fulbright, R. (2020b). The Expertise Level and the Model of Expertise, *Proceedings of the Annual USC Upstate Research Symposium*, 2020.
3. Jordan, D. and Fulbright, R. (2020c). Superhuman Diagnostic Capability in a Synthetic Elderly Companion, *Proceedings of the Annual USC Upstate Research Symposium*, 2020.
4. McKaig, R. and Fulbright, R. (2020d). Augmented, Mixed, and Enhanced Reality with an Elderly Cognitive Companion, *Proceedings of the Annual USC Upstate Research Symposium*, 2020.
5. Rowland, A. and Fulbright, R. (2020e). Synthetic Expertise: Dialoging with a Cognitive System in Mixed Reality, *Proceedings of the Annual USC Upstate Research Symposium*, 2020.
6. Sullivan, E. and Fulbright, R. (2020f). Communicating with an Elderly Cognitive Companion, *Proceedings of the Annual USC Upstate Research Symposium*, 2020.
7. Vaughan, G. and Fulbright, R. (2020g). Activity Recognition in a Synthetic Elderly Cognitive Companion, *Proceedings of the Annual USC Upstate Research Symposium*, 2020.

Peer-Reviewed Journals and Conference Proceedings

1. Fulbright, R. (2023-2024). The Expertise Level and the Model of Expertise, *Journal of Expertise*, in progress.
2. Fulbright, R. and Stavrakas, J. (2024). Scam Protection in a Synthetic Elderly Companion, HCII 2025, in progress.
3. Fulbright, R. and Morrison, M. (2024). Does Using ChatGPT Result in Human Cognitive Augmentation, *Proceedings of the HCII 2024 Conference*, to appear.
4. Fulbright, R. and McGaha, S. (2023). The Effect of Information Type on Human Cognitive Augmentation, In: Schmorrow D., Fidopiastis C. (eds) *Augmented Cognition: 17th International Conference,* AC 2023, Lecture Notes in Computer Science, vol 14019. Springer, Cham.
5. Fulbright, R., Abushanab, N., and Sullivan, E. (2022). Design Changes to a Synthetic Elderly Companion Based on an Intrusiveness Survey In: Gao, Q., Zhou, J. (eds) *Human Aspects of IT for the Aged Population. Technology in Everyday Living*. HCII 2022. *Lecture Notes in Computer Science*, vol 13331. Springer, Cham.
6. Fulbright, R. (2021). A Synthetic Elderly Companion Named Lois, Human Aspects of IT for the Aged Population. Supporting Everyday Life Activities, 7th International Conference, ITAP 2021, Held as Part of the 23rd HCI International Conference, HCII 2021, Virtual Event, July 24-29, 2021. Lecture Notes in Computer Science, vol 12787. Springer, Cham. 2021.
7. Fulbright, R. (2021). A Synthetic Elderly Companion Named Lois, *Human Aspects of IT for the Aged Population. Supporting Everyday Life Activities,* 7th International Conference, ITAP 2021, Held as Part of the 23rd HCI International Conference, HCII 2021, Virtual Event, July 24–29, 2021. Lecture Notes in Computer Science, vol 12787. Springer, Cham. 2021.
8. Fulbright, R. and Walters, G. (2020). Synthetic Expertise In: Schmorrow D., Fidopiastis C. (eds) *Augmented Cognition. Human Cognition and Behavior*. HCII 2020. Lecture Notes in Computer Science, vol 12197. Springer, Cham. 2020.

9. Fulbright, R. (2020). The Expertise Level In: Schmorrow D., Fidopiastis C. (eds) *Augmented Cognition. Human Cognition and Behavior*. HCII 2020. Lecture Notes in Computer Science, vol 12197. Springer, Cham. 2020.
10. Fulbright, R. (2019a). Operators Improve Innovative Thinking Capability, Upstate Research Symposium, Spartanburg, SC, Spring 2019.
11. Fulbright, R. (2019b). Calculating Cognitive Augmentation -A Case Study, *HCI International 2019*, Orlando, FL, July 2019.
12. Fulbright, R. (2018). On Measuring Cognition and Cognitive Augmentation, *HCI International 2018*, Las Vegas, NV, July 2018.
13. Fulbright, R. (2017a). Cognitive Augmentation Metrics Using Representational Information Theory, *HCI International 2017*, Vancouver, July 2017.
14. Fulbright, R. (2017b). ASCUE 2067: How We Will Attend Posthumously, *Proceedings of the 2017 Association of Small Computer Users in Education (ASCUE) Conference, June 2017.*
15. Fulbright, R. (2017). Innovation Assurance Using BACUP and Jobs Theory, *International Journal of Innovation Science,* Vol. 9, No. 1, January 2017.
16. Fulbright, R. (2016a). How Personal Cognitive Augmentation Will Lead to the Democratization of Expertise, *The Fourth Annual Conference on Advances in Cognitive Systems, June 2016.*
17. Fulbright, R. (2016b). The Cogs Are Coming: The Coming Revolution of Cognitive Computing, *Proceedings of the 2016 Association of Small Computer Users in Education (ASCUE) Conference, June 2016.*
18. Fulbright, R. (2015). The next big thing we can't live without? Fulbright's Half-Life theory gives us some ideas, *Proceedings of the 2015 Association of Small Computer Users in Education (ASCUE) Conference,* June 2015.

Conference Presentations and Workshops

1. "How Perceived Competence of Generative AI Affects Self Efficacy," HCII 2025
2. "Does Using ChatGPT Result In Human Cognitive Augmentation?," HCII 2024
3. "The Effect of Information Type on Human Cognitive Augmentation," HCII 2023
4. "Design Changes to Lois Based on an Intrusiveness Survey," HCII 2022
5. "A Synthetic Elderly Companion Named Lois," HCII 2021
6. "The Expertise Level," HCII 2020, Online
7. "Synthetic Expertise," HCII 2020, Online
8. "Calculating Cognitive Augmentation," HCI 2019, Orlando, FL
9. "On Measuring Cognition and Cognitive Augmentation," HCII 2018, Las Vegas, NV
10. "Cognitive Augmentation Metrics Using RIT, HCII 2017, Vancouver, BC
11. "ASCUE 2067: How We Will Attend Posthumously," ASCUE 2017, Myrtle Beach, SC
12. "Personal Cognitive Augmentation Will Lead to the Democratization of Expertise," The Fourth Annual Conference on Advances in Cognitive Systems, 2016, Evanston, IL
13. "The Cogs Are Coming: The Coming Revolution of Cognitive Computing," ASCUE 2016, Myrtle Beach, SC
14. "The next big thing we can't live without? Fulbright's Half-Life theory gives us some ideas," ASCUE 2015, Myrtle Beach, SC

Inventions, Research/Development, Design Projects Summary

- Interactive Memory Book 2023
- Expandable "Hex" Drone System (reconfigurable drone modules) 2022
- Nestables (easy covering for medicine bottles) 2020
- Safer High Chair (accommodates baby carrier safely) 2019 (student involved)
- The Date Car (autonomous vehicle for safe and secure dating) 2018
- Synthetic Expertise (human/cog ensemble) 2019
- Cognitive Elderly Companion (Lois) 2019 (student involved)
- Synthetic Friend/Therapist (Sy) 2019
- Synthetic Research Colleague (Synclair) 2019
- Autonomous Scientific Hypothesis Explorer (Ashe) 2019
- Synthetic Teacher (Synthia) 2019
- Cognitive work, cognitive power, cognitive power density 2019 (student involved)
- Cognitive energy density, cognitive characteristic 2019
- Augmentation factor (A^{+}) 2019 (student involved)
- Democratization of Expertise (mass adoption of cognitive systems tech.) 2019
- Cogs: Personal Cognitive Systems 2019
- BACUP model of innovation quality 2017 (student involved)
- MADDS (semi-autonomous drone swarm for fire-fighting) 2017 (student involved)
- USB Portable Backup (automatic backup pendant for USB drives) 2016 (student involved)
- Directional Fire Hoses (in progress) 2016 (student involved)
- SAVAR: Situation Awareness Via Automatic Radio Call Logging 2016 (student involved)
- Tip-Proof Cane (in progress) 2015 (student involved)
- The "Sherlock" Umbrella 2014
- Reflecticles (plow-Proof Roadway Reflectors) 2014
- Track Welding (novel welding wire guide) 2014

Intellectual Property/Invention Disclosures *(USC Technology Commercialization Office)*

- Hex Drone (plug-n-play reconfigurable drone modules) (patent pending) 2022-2023
- Nestables (easy covering for medicine bottles) (patent pending) 2020-2022
- Date Car (autonomous vehicle for safe dating) (patent pending) 2019-2021
- Fire-fighting drone swarm (patent awarded 2022) 2017-2019
- Drone swarms for bulk materiel supply (MADDS) (patent awarded 2022) 2017-2019
- Autonomous drone battery-swap (patent awarded 2022) 2017-2019
- Stackable battery modules for drones (patent awarded 2022) 2017-2019
- Modular power modules for drones (patent awarded 2022) 2017-2019
- Modular rotor nacelles for drones (patent awarded 2022) 2017-2019
- Modular wing attachments for drones (patent awarded 2022) 2017-2019

Research/Development/Design Experience Detail

1. **Interactive Memory Book** 2023
   A picture book containing historic images from a person's town with an conversational Chatbot integrated facilitating dialog about the person's memories of the images. Stories related to the images are recorded, transcribed, and retained for future use and reference. While perusing the book, others' stories can be told to the viewer. This kind of dialog helps stave off cognitive decline in the elderly.
2. **Expandable "Hex" Drone System** (reconfigurable drone modules) 2022
   Each module in this system is a self-contained, self-powered unit. Several units can be easily attached together creating different drone configurations with different capabilities such as flight time and lifting capacity to suit various missions.
3. **Nestables** (easy covering for medicine bottles) 2020
   Screw-on medicine bottle tops pose a challenge for the elderly or infirmed. Nestables are a type of top able to easily slip on and off of the bottle with little effort.
4. **Safer High Chair** (accommodates baby carrier safely) 2019
   When in a restaurant, people commonly turn a high chair over to place their baby carrier in the upturned legs of the chair. However, the chair is top heavy and unstable in this configuration and causes many injuries every year. This invention has a seat which inverts to accommodate the baby carrier, while leaving the bottom portion of the high chair as is.
5. **The Date Car** (autonomous vehicle for safe and secure dating) 2018
   With self-driving, autonomous vehicles not too far in the future, the Date Car is envisioned to transport underage occupants to and from a location for a date while continually monitoring their well-being and their behavior as well or better as any adult chaperone could.
6. **Synthetic Expertise** (human/cog ensemble) 2019
   In the near future, humans will work in collaborative partnership with applications and systems capable of high-level cognitive processing (even if it is not artificially intelligent). The work product of these augmented humans will be known as synthetic expertise.
7. **Cognitive Elderly Companion (Lois)** 2019
   A cognitive system implemented as a "smart home" device able to monitor, assist, and be a companion to an elderly person wishing to live independently as long as possible.
8. **Synthetic Friend/Therapist (Sy)** 2019
   A cognitive system able to converse with a person in much the same way a human friend or therapist would do to offer comfort and advice.
9. **Synthetic Research Colleague (Synclair)** 2019
   A cognitive system able to perform many of the mundane tasks a research assistant would however would be able to achieve millions of times more work in only a few hours time.
10. **Autonomous Scientific Hypothesis Explorer (Ashe)** 2019
    A cognitive system able to autonomously construct hypotheses, acquire data and information, and prove, disprove, or advance the hypotheses at computer speeds.
11. **Synthetic Teacher (Synthia)** 2019
    A cognitive system able to semi-autonouslt teach virtually any subject by monitoring and modeling the student and altering delivery of course materials accordingly. Furthermore, Synthia is envisioned to be used by the student long after graduation.
12. **Cognitive work**, cognitive power, cognitive power/energy density 2019
    These are metrics invented to compare cognitive processes and cognitive systems (systems able to perform high-level cognitive processing of data, information, and knowledge. Cognitive work is a measure of the change in information achieved by a cognitive process. Cognitive power is the amount of cognitive work expended over a unit of time and cognitive power density is the amount of cognitive work expended per unit of energy.
13. **Augmentation factor (A^+)** 2019
    The augmentation factor is a measure of how much human performance is enhanced by working collaboratively with a cognitive system.
14. **Democratization of Expertise** (mass adoption of cognitive systems tech.) 2019
    When technology becomes used by the vast majority of people, we say it has become democratized (meaning available to everyone). In the near future, most humans will be using

cognitive systems in the form of applications and devices on a daily basis. When this happens, the average person will routinely achieve what it takes an expert to achieve today thereby democratizing the access to expertise.

15. **Cogs: Personal Cognitive Systems** 2019
    In the near future, humans will work collaboratively with cognitive systems. Over time, these cognitive systems will build up a compendium of experiences and knowledge unique to the specific human/cog partnership and as such, will become the best source of information about the human even after death.
16. **BACUP model of innovation quality** 2017
    Most innovative ideas never succeed in developing into a successful innovation. There are few ways to measure how good an innovative idea is nor how to tell if an innovative idea is likely to become a successful innovation. The BACUP model defines five dimensions (business, applied innovation, creativity, unmet user needs and problem-solving) along which to score an innovative idea early in the development process. Using BACUP can increase the success rate of innovations.
17. **MADDS** (semi-autonomous drone swarm for fire-fighting) 2017
    Currently, the best airborne water/retardant delivery system for fighting wildfires can carry and drop on the order of 12,000 gallons per trip and costs hundreds of millions of dollars. MADDS is a swarm of 1,000 – 10,000 semi-autonomous drones each able to carry about 100 gallons of water/retardant. Therefore, a MADDS swarm can deliver 100,000 – 1,000,000 gallons of water/retardant per trip and costs only a fraction of an airtanker.
18. **USB Portable Backup** (automatic backup pendant for USB drives) 2016
    Many USB drives ("thumb drives") have been inadvertently left behind public computers (such as in libraries and computer labs) resulting in total loss of all files on the drive. The portable backup USB automatically maintains a backup copy of files on a portion of the drive never inserted into the computer (so cannot be left behind). If the insertable portion of the USB drive is left behind or lost in any way, the backup portion remains intact.
19. **Directional Fire Hoses** 2016
    Fire fighters trapped inside burning buildings with zero visibility are taught to "follow the line" (the firehose) out of the building by feel. However, it is not always obvious which direction is "out" when coming into contact with the hose. The directional fire hose adds features to the hose to indicate direction so fire fighters always know which way leads to safety.
20. **SAVAR: Situation Awareness Via Automatic Radio Call Logging** 2016
    Fire-fighting involves chaotic, hectic, and rapidly changing situations. Usually, a fire fighter is held in reserve to listen to the continual and overlapping radio chatter between fire fighters. However, even the best can miss an important call, report of location, etc. and in these situations it takes only a few seconds or a small lack of knowledge to cost lives. SAVAR used speech recognition and artificial intelligence to understand and automatically categorize the content of radio calls to provide an automated situational awareness of the situation.
21. **Tip-Proof Cane** 2015
    Many walking canes now have feet allowing them to stand upright when not in use. However, these canes are easily toppled because they are top-heavy. The tip-proof cane has extendable legs able to stabilize the cane in the upright position.
22. **The "Sherlock" Umbrella** 2014
    Normal-sized umbrellas lets your toes and heels get wet when walking in the rain. A large umbrella covers the toes and heels but is cumbersome and unwieldy in tight quarters like sity streets. The Sherlock is an oblong umbrella with extension in the front and back to shelter toes and heels with a normal-sized umbrella.
23. **Reflecticles** (plow-Proof Roadway Reflectors) 2014
    In many parts of the country, and around the world, low-cost reflectors are glued to road surfaces to help motorists in bad weather conditions. However, snowplows consistently scrape these off or damage them costing state and local agencies millions of dollars per year to replace them. A reflecticle is a plow-proof reflector able to withstand many years of abuse. Other plow-proof reflectors are on the market but cost 10 times as much as a "low-cost" reflector. Reflecticles actually cost the same, or even less, than the currently used low-cost reflector.

24. **Track Welding** (novel welding wire guide) 2014

Existing welding robots feature welding wire fed through conduit to the workpiece. Scratches and other abrasions damaging the wire affect quality of the weld. The track welding system delivers welding wire to the workpiece along a track not requiring the wire to slide through or past stationary points which cause the abrasions.