# College of Engineering Biographical Data

## University of Illinois at Urbana-Champaign

**Department (% appnt):** Nuclear, Plasma, and Radiological Engineering **Date:** September 2016

**1. Name:** Sullivan, Clair Julia **Birth Date:** 9/13/1975 **Citizenship:** US

**2. Present Academic Rank:** Assistant **3. Tenure Status:** P

**4. Administrative Title:**

**5. Degrees** *(field, institution, year awarded)*

1. BS, Astronomy, University of Michigan, 1997
2. BS, Physics, University of Michigan, 1997
3. MS, Nuclear Engineering, University of Michigan, 1998
4. PhD, Nuclear Engineering, University of Michigan, 2002

**6. Academic Positions at U of I and elsewhere** *(rank, institution, field, inclusive dates) (show % if you hold multiple appointments)*

1. Assistant Professor, University of Illinois, Nuclear, Plasma and Radiological Engineering, Nuclear Engineering, 2012 - present
2. Faculty Affiliate, University of Illinois, Department of Computer Science and Engineering, 2014 - present
3. Faculty Affiliate, University of Illinois, Department of Informatics, 2015 - present
4. Faculty Affiliate, University of Illinois, National Center for Supercomputing Applications, 2016 - present

**7. Professional Activities**

**a. Other Professional Employment** *(title, organization, location, inclusive dates)*

1. Scientist IV /Technical Staff Member (N-2: Advanced Nuclear Technology), Los Alamos National Laboratory, Los Alamos, NM, 2002-2009
2. Senior Project Leader (Defense and Intelligence Program Office), Los Alamos National Laboratory, Los Alamos, NM, 2007-2009
3. Technical Intelligence Officer, Central Intelligence Agency, Washington, DC, 2009-2012

**b. Major Consulting Activities** *(past five years) (list organization and location)*

1. Guest Scientist, Los Alamos National Laboratory, 2013-present
2. Founder and Chief Executive Officer, La Neige Analytics, 2015 - present

**c. Professional Registrations** *(field, location, date)*

1.

**8. Honors, Recognition, and Outstanding Achievements** *(list year)*

| Award Name | Citation | Date Awarded |
|---|---|---|

| | | |
|---|---|---|
| DARPA Young Faculty Award | Defense Advanced Research Projects Agency | 2014 |
| Mary Jane Oestmann Professional Women's Achievement Award | American Nuclear Society (National Award) | 2015 |

**a. Teaching**

| Award Name | Citation | Date Awarded |
|---|---|---|
| Excellence in Undergraduate Teaching | American Nuclear Society Student Chapter | 2013 |
| Collins Fellow | Academy of Excellence in Engineering Education (AE3) | 2013 |
| List of Teachers Ranked as Excellent by their Students | University of Illinois at Urbana-Champaign | Spring, 2013 |
| List of Teachers Ranked as Excellent by their Students | University of Illinois at Urbana-Champaign | Fall, 2013 |
| List of Teachers Ranked as Excellent by their Students | University of Illinois at Urbana-Champaign | Spring, 2014 |
| List of Teachers Ranked as Excellent by their Students | University of Illinois at Urbana-Champaign | Fall, 2014 |
| Engineering Council Award for Excellence in Advising | University of Illinois at Urbana-Champaign | 2015 |
| Excellence in Undergraduate Teaching | American Nuclear Society Student Chapter, University of Illinois at Urbana-Champaign | 2015 |
| List of Teachers Ranked as Excellent by their Students (awarded for two courses: NPRE 451 and NPRE 498) | University of Illinois at Urbana-Champaign | Spring, 2015 |
| List of Teachers Ranked as Outstanding by their Students (awarded to top 10% of all instructors) | University of Illinois at Urbana-Champaign | Fall, 2015 |

**b. Research**

| Award Name | Citation | Date Awarded |
|---|---|---|
| Graduate Student of the Year | University of Michigan, Department of Nuclear Engineering and Radiological Sciences | 2002 |
| Distinguished Performance Award | Los Alamos National Laboratory | 2004 |
| Exceptional Performance Award | Central Intelligence Agency | 2010 |
| Finalist for ICy Award (Annual Media Award) | Central Intelligence Agency | 2013 |

**c. Public Service**

**d. Others**

| Award Name | Citation | Date Awarded |
|---|---|---|
| Best Paper (Undergraduate Student, Radiation Detection) | American Nuclear Society Student Conference, awarded to students supervised by Prof. Sullivan | 2013 |

**9. Web pages**

| Full website URL | Text for link |
|---|---|
| rdii.npre.illinois.edu | Radiation Detection and Isotope Identification Group |

**FACTUAL INFORMATION**

**A. Resident Instruction and Continuing Education** *(attach Teaching Activity reports, which covers 10 years)*

**1. Resident Instruction** *(verify the information on the appended page for sections in which you had primary responsibility; pencil in corrections)*

1. Fall, 2012: NPRE 451 (NPRE Laboratory)
2. Spring, 2013: NPRE 451 (NPRE Laboratory)
3. Fall, 2013: NPRE 451 (NPRE Laboratory)
4. Spring, 2014: NPRE 451 (NPRE Laboratory)
5. Fall, 2014: NPRE 451 (NPRE Laboratory)
6. Spring, 2015: NPRE 451 (NPRE Laboratory)
7. Spring, 2015: NPRE 498 (Advanced Radiation Detection Concepts)
8. Fall, 2015: NPRE 451 (NPRE Laboratory)
9. Spring, 2016: NPRE 451 (NPRE Laboratory)
10. Fall, 2016: NPRE 498 (Advanced Radiation Detection Concepts)
11. Fall, 2016: NPRE 598 (Advanced Radiation Detection Concepts)

**2. Continuing Education** *(credit courses only) (year, course, # of students, delivery method)*

**3. Other Instructional Activities** *(prelim and final exams, course development, short courses, etc.)*

1. Spring, 2013: Guest Lecturer, NPRE 458 (Design in NPRE, provided lecture titled "Elements of Radioprotection Design")
2. Fall, 2013: Guest Lecturer, Law 699 (Independent Study, provided lecture titled "Legal Implications of Nuclear Energy")
3. Spring, 2014: Guest Lecturer, Law 792 (Current Legal Problems: Ethics, Economics, and the Environment, provided lecture on "Ethical Implications of Nuclear Energy")
4. Spring, 2014: Guest Lecturer, NPRE 458 (Design in NPRE, provided lecture titled "Elements of Radioprotection Design")
5. Spring, 2015: Guest Lecturer, NPRE 458 (Design in NPRE, provided lecture titled "Elements of Radioprotection Design")
6. Spring, 2016: Guest Lecturer, NPRE 458 (Design in NPRE, provided lecture titled "Elements of Radioprotection Design")

**a. Prelim and Final Exams**

| Doctoral Candidate | Prelim Exam Date | Final Exam Date | (Co-)Chair | (Co-)Director |
|---|---|---|---|---|
| Soonwook Jung | February 19, 2013 | June 6, 2014 | David Ruzic | |
| Liang Cai | March 1, 2013 | August 15, 2013 | Ling-Jian Meng | |
| Yi Liu | January 20, 2016 | Expected January, 2017 | Clair Sullivan | |
| Jacob Stinnett | January 21, 2016 | October 7, 2016 | Clair Sullivan | |
| Xiaochun Lai | February 9, 2015 | August 15, 2016 | Ling-Jian Meng | |

**b. Course Development**

1. NPRE 498: Advanced Radiation Detection Concepts
2. NPRE 444: Nuclear Analytical Methods Lab
3. NPRE 598: Advanced Radiation Detection Concepts

**c. Short Courses**

**4. Undergraduate Advising**

**a. Academic Advising** *(number of students, current year only)*

1. 20

**b. Student Organizations** *(list past five years)*

1. Faculty Advisor, American Nuclear Society, Student Chapter, 2013 - present
2. Faculty Advisor, Be the Match, 2014 - present
3. Faculty Advisor, Women in Nuclear, Student Chapter, 2015 - present
4. Faculty Advisor, The Hacker Within, UIUC Chapter, 2015 - present

**c. Design Teams** *(past five years)*

1. 2013: Radiation Detector Sensor Networks using Social Media
2. 2014: Visual Interface for Radiation Detection (ViRAD)
3. 2015: Radiation Detection using the Raspberry Pi Architecture
4. 2016: New Methods for Generating He-3 for Neutron Detectors

**d. Other** *(individual projects, engineering open house, etc. past five years)*

**B. Research, Creative, and Other Scholarly Activities**

**1. Publications**

List publications in print or accepted, with authors' names ordered the way they appear on the publications. Provide inclusive page numbers for papers in proceedings and journals. Follow the outline given below for the organization of the list of publications. Within each category place items in chronological order.

(*) has undergone stringent editorial review by peers
(**) invited and carries with it prestige and recognition
(s) based on work as a student
(w) co-authored with students you supervise
(!) represents most important contribution of the past decade
(P) derived from PhD thesis
(D) co-authored with post-docs

**a. Books Authored or Co-Authored**

**1. Original Editions**

1. (**)(!) W.H. Casson, C.J. Sullivan, J.M Blackadar, R.P. Paternoster, J.L. Matzke, M. Rawool-Sullivan, *Nuclear Reachback Reference Manual,* Department of Homeland Security, LA-UR-06-0504, 2006.
2. (**) C.J. Sullivan, *Modern Methods of Gamma-Ray Spectroscopy and Isotope Identification*. IOP Publishing, Bristol, UK. *In preparation.*

**2. Revisions**

**b. Books Edited or Co-Edited**

**1. Original Editions**

**2. Revisions**

**c. Chapters in Books**

1. (**) C.J. Sullivan, "Basic Nuclear Physics," in W.H. Casson, C.J. Sullivan, J.M. Blackadar, R.P. Paternoster, J.L. Matzke, M. Rawool-Sullivan, *Nuclear Reachback Reference Manual,* Department of Homeland Security, LA-UR-06-0504, 2006.
2. (**) C.J. Sullivan, "Isotope Identification Algorithms," in W.H. Casson, C.J. Sullivan, J.M. Blackadar, R.P. Paternoster, J.L. Matzke, M. Rawool-Sullivan, *Nuclear Reachback Reference Manual,* Department of Homeland Security, LA-UR-06-0504, 2006.
3. (**) C.J. Sullivan, "Radiation Detection and Measurement," in M. Kutz (ed.), *Handbook of Measurement in Science and Engineering, Volume 3*, John Wiley & Sons, Inc., Hoboken, NJ. 2016.
4. (*)(**)(!)(D) M-H Jeong, C.J. Sullivan, S. Wang, "Analysis of Dynamic Radiation Level Changes Using Surface Networks," in H. Onsrud and W. Kuhn (ed.), *Advancing Geographic Information Science: The Past and Next Twenty Years.* GDSI Association Press. Needham, MA. 2016.

**d. Monographs** *(longer than an article, but shorter than a book)*

**e. Articles**

**1. Articles In Journals**

1. (*)(S) C.J. Branch (nee), J.D. Sanders, K.J. Kearfott, B. Stojadinovic, D.K. Wehe, "An augmented reality radiation display systems (ARRDS) for radiation protection applications," *Transactions of the American Nuclear Society*, 81 (1999) 247.
2. (*)(S) C.J. Branch (nee) and K.J. Kearfott, "Positional glow curve simulation for thermoluminescent detector (TLD) system design," *Nuclear Instruments and Methods in Physics Research A*, 422 (1999) 638-642.
3. (*)(S)(P) C.J. Sullivan, Z. He, G.F. Knoll, G. Tepper, D.K. Wehe, "A high pressure xenon gamma-ray spectrometer using a coplanar anode configuration," *Nuclear Instruments and Methods in Physics Research A*, 505 (2003) 238-241.
4. (*)(W) C.J. Sullivan, M.E. Martinez, S.E. Garner, Wavelet analysis of sodium iodide spectra, *IEEE Transactions on Nuclear Science*, 53 (5) (2006) 2916-2922.
5. (*)(W) Y. Feng, J.E. Baciak, C. Sullivan, G. Gardner, "A pixilated design of high pressure xenon gamma-ray spectrometer," *Nuclear Instruments and Methods in Physics Research A*, 579 (2007) 54-57.
6. (*) C.J. Sullivan, S.E. Garner, K.B. Blagoev, D.L. Weiss, "Generation of customized wavelets for the analysis of gamma-ray spectra," *Nuclear Instruments and Methods in Physics Research A*, 579 (2007) 275-278.
7. (*)(W)(!) C.J. Sullivan and J. Stinnett, "Validation of a Bayesian-based isotope identification algorithm," *Nuclear Instruments and Methods in Physics Research A*, 784 (2014) 298-305.
8. (*)(W)(!) Z. Liu and C.J. Sullivan, "Mobile Radiation Sensor Networks for Source Detection in a Fluctuating Background Using Geo-tagged Count Rate Data," *IEEE Transactions on Nuclear Science,* accepted for publication, in revision.
9. (*)(W) J. Stinnett, M.M. Watson, C.J. Sullivan, H. Xiong, "Feature Extraction and Isotope Identification on NaI Gamma-Ray Spectra," *IEEE Transactions on Nuclear Science*, accepted for publication, in revision.
10. (*)(W) J. Zhao and C.J. Sullivan, "Spectral Analysis from Radiation Sensor Networks using Principal Component Analysis," *IEEE Transactions on Nuclear Science,* accepted for publication, in revision.
11. (*)(W)(!) M. Kamuda and C.J. Sullivan, "Automated Isotope Identification Algorithm Using Artificial Neural Networks," *IEEE Transactions on Nuclear Science,* accepted for publication, in revision.
12. (*)(W) Y. Liu, C.J. Sullivan, and F. d'Errico, "Machine Learning Method Applied in Readout System of Superheated Droplet Detector," *IEEE Transactions on Nuclear Science,* accepted for publication, in revision.
13. (*)(D) M-H Jeong, C.J. Sullivan, and S. Wang, "Urban search of radioactive materials enhanced by mobile sensor networks and geospatial methods," *IEEE Transactions on Nuclear Science*, accepted for publication, in revision.

14. (*)(**) C.J. Sullivan, "Radiation hotspot detection with sensor networks enabled by geospatial techniques," *CyberGIS'16*, INVITED PAPER, in revision.
15. (*)(D) M-Hun Jeong, Y. Cai, C.J. Sullivan and S. Wang, "Data depth based clustering analysis," *Association for Computing Machinery SIGSPATIAL*, accepted for publication, in revision.

**2. Articles In Conference Proceedings**

1. J.M. Blackadar, J.A. Bounds, P.A. Hypes, D.J. Mercer, C.J. Sullivan, "Evaluation of handheld isotope identifiers," *Proceedings of the INMM Southwest Section Meeting*, (2003) LA-UR-03-2742.
2. J.M. Blackadar, C.J. Sullivan, B.G. Rees, S. Garner, D.J. Mercer, "Continuing evaluation of isotopic identifiers," *Proceedings of the 45th Annual INMM Meeting*, (2004) LA-UR-03-2742.
3. C.J. Sullivan, S.E. Garner, K.B. Butterfield, "Wavelet analysis of gamma-ray spectra," *IEEE Nuclear Science Symposium Conference Record*, 1 (2004) 281-286.
4. S.L. Seitz, J.M. Blackadar, S.K. Almecci, M.A. Nelson, G.H. Gardner, M. Rawool-Sullivan, B.G. Rees, J.A. Bounds, W.H. Casson, S.E. Garner, C.J. Sullivan, "Radiation detection evaluation: RadAssessor characterizes integrated findings," *IEEE Nuclear Science Symposium Conference Record*, 1 (2005) 288-291.
5. (W) C.J. Sullivan, M.E. Martinez, S.E. Garner, "Wavelet analysis of sodium iodide spectra," *IEEE Nuclear Science Symposium Conference Record*, 1 (2005) 302-306.
6. (W) Y. Feng, J.E. Baciak, C.J. Sullivan, G.H. Gardner, "Pixelated designs of high pressure xenon gamma-ray spectrometer and position sensing," *Proceedings of the SPIE*, 6319 (2006).
7. (W) C.J. Sullivan, S.E. Garner, M. Lombardi, K.B. Butterfield, "Evaluation of key detector parameters for isotope identification," *IEEE Nuclear Science Symposium Conference Record*, 2 (2007) 1181-1184.
8. C.J. Sullivan, A. Burger, M. Groza, T.H. Prettyman, "Bulk uniformity of cadmium zinc telluride (CZT) crystals for large volume coplanar gamma spectrometers," *IEEE Nuclear Science Symposium Conference Record*, 3 (2007) 1805-1808.
9. S.A. Awadalla, H. Chen, J. Mackenzi, P. Lu, K. Iniewski, P. Marthandam, R. Redden, G. Bindley, Z. He, F. Zhang, M. Groza, A. Burger, D.R. Mayo, C.J. Sullivan, Thickness scalability of large volume cadmium zinc telluride high resolution radiation detectors, *IEEE Nuclear Science Symposium Conference Record*, 1 (2008) 58-62.
10. (W) K. Weichman, K. Schoemaker, B. Russell, J. Rehal, C.J. Sullivan, "SEE RADS platform: social, every day, and emergency radiation detection system," *American Nuclear Society Student Conference Record,* (2013)
11. (W) J. Stinnett, C.J. Sullivan, "An Automated Isotope Identification Algorithm Using Bayesian Statistics," *IEEE Nuclear Science Symposium Conference Record*, (2013).
12. (W) C.J. Sullivan, J. Lu, "Automated Photopeak Detection and Analysis in Low Resolution Gamma-Ray Spectra for Isotope Identification," *IEEE Nuclear Science Symposium Conference Record,* (2013).
13. C.J. Sullivan, "Nuclear Forensics Driven by Geographic Information Systems and Big Data Analytics," *Conference Proceedings of the Institute for Nuclear Materials Management on Information Analysis Technologies, Techniques and Methods for Safeguards, Nonproliferation and Arms Control Verification Workshop*, (2014) 273-286.
14. (W) J.B. Stinnett, C.J. Sullivan, "Automated Isotope Identification of Single-Source and Mixed-Sources," *IEEE Nuclear Science Symposium Conference Record*, (2014).
15. S.A. Pozzi, S.D. Clarke, D.K. Wehe, Z. He, K. Kearfott, J.C. Lee, A. Hero, M. Flaska, A. DiFulvio, R. Lanza, S. Kemp, J. Fischer, A. Danagoulian, A. Glaser, F. von Hippel, P. Richards, J.K. Mattingly, M. Garces, I. Jovanovic, L. Carin, P. Wilson, J. Baciak, A. Enqvist, A. Farsoni, F. d'Errico, C.J. Sullivan, "Consortium for Verification Technology Research Activities," *Proceedings of the Institute for Nuclear Materials Management*, (2015).
16. (D) M-H Jeong, C.J. Sullivan, S. Wang, "Complex radiation sensor network analysis with big data analytics," *IEEE Nuclear Science Symposium Conference Record,* (2015).
17. (W) Y. Liu, C.J. Sullivan, F. d'Errico, "Superheated Droplets Detector for Thermal Neutron Detection," *IEEE Nuclear Science Symposium Conference Record,* (2015).

18. (W) J. Stinnett, C.J. Sullivan "Automated Isotope Identification with Bayesian Classifiers," *IEEE Nuclear Science Symposium Conference Record,* (2015).
19. (D) M.-H. Jeong, S. Wang, and C. J. Sullivan. Density maps based on data. In *Proceedings of the 3rd International Conference on CyberGIS and Geospatial Data Science*, 2016.
20. (D) M-H Jeong, C.J. Sullivan, M. Cheng, S. Wang, "Minimization of the impact of sensor velocity on the probability of source detection using geographically weighted methods," *IEEE Nuclear Science Symposium.* Accepted for presentation. 2016.
21. (W) Y. Liu, C.J. Sullivan, F. d'Errico, "Thermal neutron detection with superheated droplet detector and real-time readout system," *IEEE Nuclear Science Symposium.* Accepted for presentation. 2016
22. (W) M. Kamuda, J. Stinnett, C.J. Sullivan, "Peak quantification with neural networks for low-resolution NaI spectra," *IEEE Nuclear Science Symposium.* Accepted for presentation. 2016.
23. (W) J. Zhao, K.A. Roth, C.J. Sullivan, "Simulation and implementation of mobile sensor networks for radiation detection," *IEEE Nuclear Science Symposium.* Accepted for presentation. 2016.
24. (W) Z. Liu and C.J. Sullivan, "Urban source detection with mobile sensor networks enhanced with machine learning algorithms," *IEEE Nuclear Science Symposium.* Accepted for presentation. 2016
25. (D) M-H Jeong, J. Yin, C.J. Sullivan, and S. Wang, "Robust statistical approaches to enhance spatial autocorrelation," *Proceedings of GIScience 2016.* Accepted for publication. 2016.
26. (*)(**) C.J. Sullivan, "Radioactive Source Localization in Urban Environments with Sensor Networks and the Internet of Things," *IEEE International Conference on Multisensor Fusion and Integration for Intelligent Systems*, 2016.
27. (W) J. Mattingly, J. Hutchinson, C. Sullivan, J. Stinnett, M. Kamuda, M. Alamaniotis, B. Simms, J. Mueller, J. Newby, J. Linkous, S. Pozzi, K. Polack, M. Hamel, Z. He, D. Goodman, M. Streicher, "CNEC and CVT Subcritical Experiments with Category I Special Nuclear Material at the Nevada National Security Site Device Assembly Facility," *Proceedings for the Institute of Nuclear Materials Management,* (2016).

**f. Pending Publications**

1. (*)(W) C.J. Sullivan, H. Xiong, and X. Kong, "Wavelet-Based Method for the Quantitative Analysis of Photopeaks within Gamma-Ray Spectra," *In preparation.*
2. (*)(D) C.J. Sullivan, M.H. Jeong, S. Wang, "Application of Geographic Information System Techniques to the Analysis of Radiation Sensor Networks," *In preparation.*
3. (W) J. Stinnett, C.J. Sullivan, "A Bayesian-Based Algorithm for the Analysis of Low-Resolution Gamma-Ray Spectra," *In preparation.*

**g. Invited Lectures**

| Title | Conference | Location | Year | URL |
|---|---|---|---|---|
| Instrumentation for Homeland Defense | Seminar | University of Florida | 2005 | |
| Techniques of Isotope Identification: Gamma-Ray Spectroscopy in the Real World | JOWOG-29 | Department of Energy | 2006 | |
| Rapid Response Spectral Analysis | Workshop | International Atomic Energy Agency, Vienna, Austria | 2006 | |
| Wavelet Analysis of Gamma-Ray Spectra | Seminar | North Carolina State University | 2012 | |
| Wavelet Analysis of Gamma-Ray Spectra | Seminar | Massachusetts Institute of Technology | 2012 | |
| Wavelet Analysis of Gamma-Ray Spectra | Seminar | University of Michigan | 2012 | |
| Evaluation of Radiation Detectors for Nuclear Emergency Response | Seminar | University of Illinois | 2012 | |

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|---|---|---|---|
| Radiation Detection for Nuclear Emergency Response | Seminar | University of Illinois | 2012 |
| Alumni Perspective (Panelist) | Celebrating 25 Years of Undergraduate Research: Diversity, Inclusion, and Impact | University of Michigan | 2014 |
| Radiation Detection for Nuclear Emergency Response | Seminar | Kansas State University | 2014 |
| Nuclear Forensics Driven by Geographic Information Systems and Big Data Analytics | Seminar | University of Illinois Department of Computer Science and Engineering | 2014 |
| Radiation Detection for Nuclear Emergency Response | Seminar | University of Wisconsin | 2015 |
| Nuclear Forensics Driven by Geographic Information Systems and Big Data Analytics | Seminar | Los Alamos National Laboratory | 2015 |
| Radiation Detection for Nuclear Emergency Response | Seminar | University of Florida | 2016 |
| Radiation Sensor Network Measurements Decoded through Data Analytics | Seminar | University of California at Berkeley | 2016 |
| Radioactive Source Localization in Urban Environments with Sensor Networks and the Internet of Things | *IEEE International Conference on Multisensor Fusion and Integration for Intelligent Systems* | Baden-Baden, Germany | 2016 |
| Nuclear Emergency Response using Radiation Sensor Networks and Data Science | Seminar | University of Utah | 2016 |

**h. Other Publications** *(patents, bulletins or reports, magazine articles, etc.)*

**1. Patents**

1. (S) C.J. Branch (nee), K.J. Kearfott, D.S. McGregor, Augmented Reality Radiation Display System and In Situ Spectrometry Method for Determining the Depth Distribution of Radionuclides (1999) *U.S. Provisional Patent, Serial No. 60/129,837*, Washington, DC: U.S. Patent and Trademark Office.
2. (S) C.J. Branch-Sullivan, K.J. Kearfott, B. Stojadinovic, D.S. McGregor, Method and System for High-Speed 3D Imaging of Optically-Invisible Radiation (2004) *U.S. Patent No. 6,815,687*, Washington, DC: U.S. Patent and Trademark Office.
3. K.D. Ianakiev, P.B. Littlewood, K.B. Blagoev, M.T. Swinhoe, J.L. Smith, C.J. Sullivan, B.S. Alexandrov, J.C. Lashley, Semiconductor Neutron Detector (2011) *U.S. Patent No. 7,902,517*, Washington, DC: U.S. Patent and Trademark Office.

**2. Bulletins**

**3. Magazine Articles**

1. D. Ambrose and C.J. Sullivan, "STEM Leader From the Roeper School: An Interview With Nuclear Engineer Clair J. Sullivan", *Roeper Review*, 38:199 202, 2016.

**4. Reports**

1. C.J. Branch-Sullivan, R.J. Estep, “Three-dimensional imaging of radiological contamination in soil using the material basis set method,” (2000) LA-UR-00-2163.
2. J.M. Blackadar, C.J. Sullivan, B.G. Rees, “A twelve category approach to evaluating the correctness of isotope identification,” (2004) *LA-UR-04-0192*.

3. C.J. Sullivan, K.D. Ianakiev, “Analysis of vibration-resistant electrode design of gas-based gamma-ray spectrometers for spectroscopic portal monitors,” (2005) *LA-UR-05-4005*.
4. C.J. Sullivan, D.L. Weiss, “Wavelet work for the MIMBS project,” (2006) *LA-UR-06-6834*.
5. C.J. Sullivan, “Low-resolution gamma-ray spectroscopy with wavelet analysis,” (2008) *LA-UR-08-00684*.

**2. Grants, contracts and gifts** *(in chronological order up to past ten years)*

**a. For Research**

| Years (Inclusive) | Brief Title or Description | Source of Funds | Total Funding | Funds Allocated to this prof | #PI's and lead PI if not this prof |
|---|---|---|---|---|---|
| 2004-2005 | Vibration-Resistant High Pressure Xenon Detectors | Department of Homeland Security | $150,000 | $150,000 | 1 |
| 2005-2008 | New Materials for Radiation Detection | Los Alamos National Laboratory - Laboratory Directed Research and Development (LDRD) - Directed Research (DR) | $3,100,0000 | $225,000 | 3 PIs, Lead PI: Darryl Smith |
| 2006-2008 | Wavelet-Based Isotope Identification Algorithm | Department of Energy, Office of Emergency Response (NA-42) | $500,000 | $500,000 | 1 |
| 2006-2008 | 6 $cm^3$ CdZnTe Isotope Identifier | Department of Energy, Office of Nonproliferation Verification Research and Development (NA-22) | $600,000 | $600,000 | 1 |
| 2013-2018 | Isotope Identification of Post-Detonation Debris using Advanced Mathematical Techniques | Defense Threat Reduction Agency | $782,744 | **$782,744** (Year 1: $157,359, Year 2: $161,681, Year 3: $168,034, Year 4: $145,875, Year 5: $149,794) | 1 |
| 2014-2019 | Consortium for Verification Technology (CVT), "Radionuclide Information Barriers using Novel Statistical Approaches" | National Nuclear Security Administration (NNSA), Department of Energy | $25,000,000 | **$798,288** (Year 1: $160,087, Year 2: $159,637, Year 3: $159,721 , Year 4: $159,833 Year 5: $159,009 ) | 10 PIs, Lead PI: Sara Pozzi (University of Michigan) |
| 2014-2019 | Consortium for Nonproliferation Enabling Capabilities (CNEC), "Simulation of Data-Enhanced Radiation Sensor Networks" | National Nuclear Security Administration (NNSA), Department of Energy | $25,000,000 | **$1,487,125** (Year 1: $287,125, Year 2: $300,000, Year 3: $300,000, Year 4: $300,000, Year 5: $300,000) | 5 PIs, Lead PI: Robin Gardner (North Carolina State University) |
| 2014-2016 | | | $149,406 | | |

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|---|---|---|---|---|---|
| | Detection of the Illicit Movement of Nuclear Materials with Big Data | University of Illinois, College of Engineering, Strategic Research Initative | | **$149,406** (Year 1: $74,841, Year 2: $74,564) | 3 PIs, Lead PI: Clair Sullivan |
| 2014-2016 | Long-Range Detection of Special Nuclear Materials | Defense Advanced Research Projects Agency (DARPA) Young Faculty Award | $489,662 | **$489,662** (Year 1: $244,973, Year 2: $244,689) | 1 |
| 2017-2020 | RadSITE™ Directional RAD/NUC Finder | Department of Homeland Security (DHS), Domestic Nuclear Detection Office (DNDO) | $2,000,000 (PENDING) | **$250,000 (PENDING)** | 3 PIs, Lead PI: James Winso (Spectral Labs Inc.) |
| 2017-2020 | Development of Radiation Context Awareness Framework for Police Vehicles | Department of Homeland Security (DHS), Domestic Nuclear Detection Office (DNDO) | $2,500,000 (PENDING) | **$240,000 (PENDING)** | 4 PIs, Lead PI: Daniel Chivers (Berkeley Applied Analytics) |
| 2017-2020 | Transformational Improvements in Vehicle Based Rad/Nuc Monitoring by Data Fusion | Department of Homeland Security (DHS), Domestic Nuclear Detection Office (DNDO) | $1,890,000 (PENDING) | **$290,000 (PENDING)** | 5 PIs, Lead PI: Craig Duff (Kromek, Ltd.) |
| FY15 | TOTAL FUNDING AVAILABLE TO PI | | | | $924,385 |
| FY16 | TOTAL FUNDING AVAILABLE TO PI | | | | $940,571 |
| FY17 | TOTAL FUNDING AVAILABLE TO PI | | | | $627,755 |
| FY18 | TOTAL FUNDING AVAILABLE TO PI | | | | $459,833 |
| FY19 | TOTAL FUNDING AVAILABLE TO PI | | | | $459,009 |

**b. For Instruction**

**3. Areas of Research** *(brief description, key words are adequate)*

1. Radiation detection and measurements; gamma-ray spectroscopy; automated isotope identification algorithms; nuclear forensics; nuclear security; nuclear nonproliferation; sensor networks; big data; new materials for radiation detection

**4. Graduate Thesis Research Advising** *(list co-advisor, if any)*

**a. M.S. Thesis Students** *(name and year granted or anticipated)*

| Student Name | Year Graduated | Thesis Title | Placement |
|---|---|---|---|
| Jie Lu | 2013 | Wavelet Methods for Peak Quantification in Low-Resolution Gamma-Ray Spectra | N/A |
| Xianliang Kong | 2014 | Advanced Adaptive Gamma-Ray Libraries for Isotope Identification | Evolution Lab |
| Jacob | 2014 | The Use of Bayesian Analysis for Automated Isotope | Completed |

| | | | |
|---|---|---|---|
| Stinnett | | Identification | PhD |
| Hao Xiong | 2015 | Photopeak Detection and Noise Analysis using Advanced Mathematical Techniques | Delvv, Inc. |
| Zheng Liu | 2016 | Mobile Radiation Sensor Networks for Source Detection in a Fluctuating Background using Geo-tagged Count Rate Data | Continuing for PhD |
| Jifu Zhao | 2016 | Graph Theoretic Approaches for the Measurement of Radiation Background and Sources | Continuing for PhD |
| Mark Kamuda | expected 2017 | Post-Detonation Debris Analysis with Advanced Spectroscopic Techniques | N/A |
| Karl Roth | expected 2017 | Detection of Radioactive Sources using Geospatially-Enhanced Radiation Sensor Networks | N/A |
| Michael Cheng | expected 2017 | TBD | N/A |
| Christian Zircher | expected 2017 | Data Visualization of Complex Sensor Networks | N/A |

**b. Ph.D. Thesis Students** *(name and year granted or anticipated)*

| Student Name | Year Graduated | Thesis Title | Placement |
|---|---|---|---|
| Jacob Stinnett | October 7, 2016 | The Use of Bayesian Analysis for Automated Isotope Identification | Los Alamos National Laboratory |
| Yi Liu | expected 2017 | Superheated Liquid Emulsion Drop Devices for the Discrimination of Fast and Thermal Neutrons | Facebook |

**5. Editorships of Journals or Other Learned Publications** *(list year)*

1. Associate Editor, IEEE Transactions on Nuclear Science: 2006-2008
2. Associate Editor, Journal of Intelligence Community Research and Development (CLASSIFIED PUBLICATION): 2010-2012
3. Associate Editor, IEEE Transactions on Nuclear Sciences: 2012-2015

**6. Post-doctoral Associates and Visiting Scientists** *(>3 months stay in the past three years) (list name, year(s), country of origin, permanent employer)*

| Name | Title (percent time) | Country of Origin | Permanent Employer | Years |
|---|---|---|---|---|
| Andrea Mattera | Visiting graduate student | Italy | University of Pisa | 2015 |
| Myeong Hun Jeong | Postdoctoral Research Assistant (50%) | Korea | NCSA | 2015 |

**7. Other Scholarly Activities in the past five years** *(conferences organized or chaired, unpublished presentations, etc.)*

**a. Conferences Organized or Chaired**

1. Organizing Committee, *IEEE Nuclear Science Symposium and Medical Imaging Conference*, Strasbourg, France, 2016
2. General Chair, *Industrial Radiation and Radioisotope Measurement Applications-10*, Chicago, IL, 2017
3. Workshop Chair, Symposium on Radiation Measurements and Applications (SORMA) Radiation + Data Science Workshop, Berkeley, CA, 2016.

**b. Unpublished Presentations**

**c. Other Scholarly Activities**

1. Technical Reviewer, *Symposium on Radiation Measurements and Applications (SORMA) XV*, 2014

2. Session Chair, *Symposium on Radiation Measurements and Applications (SORMA) XV,* 2014
3. Session Chair, *IEEE Nuclear Science Symposium,* 2014
4. Topic Area Convener, Homeland and National Security Instrumentation, *IEEE Nuclear Science Symposium,* 2015
5. Session Chair, *IEEE Nuclear Science Symposium*, 2015
6. Technical Reviewer, *Symposium on Radiation Measurements and Applications (SORMA) XVI*, 2016
7. Session Chair, *Symposium on Radiation Measurements and Applications (SORMA) XVI*, 2016

**C. Service**

**1. Professional Societies** *(list membership; office held, with dates; major committees or boards)*

1. Member, American Nuclear Society, 1997 - 2002, 2015 - present
2. Member, Association for Computing Machinery, 1997 - 1999
3. Member, Health Physics Society, 1997 - 1999
4. Member, Institute of Electrical and Electronics Engineers (IEEE), 2000 - present
5. Reviewer, *Nuclear Instruments and Methods in Physics Research A,* 2000 - present
6. Reviewer, *IEEE Transactions on Nuclear Science,* 2000-2006
7. Reviewer, ANSI/IEEE Standard N42.34-2003, "Performance Criteria for Hand-Held Instruments for the Detection and Identification of Radionuclides," 2002-2003
8. Reviewer, ANSI/IEEE Standard N42.32-2002, "American National Standard Performance Criteria for Alarming Personal Radiation Detectors for Homeland Security," 2002-2003
9. Reviewer, *Journal of Intelligence Community Research and Development (CLASSIFIED PUBLICATION),* 2005-2008

**2. University** *(department, college and campus committees, administration, etc. for past five years)*

**a. Department**

1. Member, Department of Nuclear, Plasma, and Radiological Engineering Search Committee, 2012-2013
2. Member, Department of Nuclear, Plasma, and Radiological Engineering Qualifying Exam Committee, 2013-2014
3. Member, Department of Nuclear, Plasma, and Radiological Engineering Search Committee, 2013-2014
4. Member, Department of Nuclear, Plasma, and Radiological Engineering Search Committee, 2014-2015
5. Member, Department of Computational Science and Engineering Annual Meeting Committee, 2014-2015
6. Member, Department of Nuclear, Plasma, and Radiological Engineering Undergraduate Education Committee, 2015-2016
7. Member, Department of Nuclear, Plasma, and Radiological Engineering Search Committee, 2015-2016

**b. College**

1. Member, College of Engineering Teaching Evaluation and Improvement Committee, 2013-2014
2. Member, College of Engineering Big Data Graduate Curriculum Committee, 2014-2015
3. Member, College of Engineering Teaching Evaluation and Improvement Committee, 2014-2015
4. Member, College of Engineering Committee for M.Eng. in Big Data, 2015-2016

**c. Campus**

1. Member, Applied Research Institute (ARI) Search Committee, 2012-2013

**3. Federal and State** *(government commissions or panels, community, industrial extension, etc.)*

1. Independent Review Panel Member, Department of Energy, Office of Nonproliferation Research and Development (NA-22), 2013
2. Proposal Review Panelist, National Science Foundation, 2013
3. Independent Review Panel Member, Department of Energy, Office of Nonproliferation Research and Development (NA-22), 2016

**4. Other Outside Service**

**D. Improvement Activities** *(list any specific programs in which you have participated it improve teaching and professional competence)*

1. National Science Foundation Grant Writing Workshop, University of Illinois at Chicago, 2012
2. FastStart Program, Academy for Excellence in Engineering Education, University of Illinois at Urbana-Champaign, 2012 - 2013
3. Career Development Workshop, Academy for Excellence in Engineering Education, University of Illinois at Urbana-Champaign, 2013
4. Course (Re)Design, Academy for Excellence in Engineering Education, University of Illinois at Urbana-Champaign, 2013
5. The Flipped Classroom, Academy for Excellence in Engineering Education, University of Illinois at Urbana-Champaign, 2013
6. Big Data Workshop, Department of Computer Science and Engineering, University of Illinois at Urbana-Champaign, 2014
7. Scholar, The Data Incubator, Washington, DC, 2015

**E. Professional Highlights**