

Irucka Embry, E.I.T.

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Education:

Doctor of Philosophy in Engineering Program, Tennessee Technological University (August 2012 – January 2013)

Concentration in Environmental Engineering

10 semester hours completed

Master of Engineering, Tennessee State University (August 2012)

Concentration in Environmental Engineering

Overall Cumulative GPA: 4.00/4.00

Post-Baccalaureate Program, University of Kentucky (August 2004 – May 2005)

Civil and Environmental Engineering

Overall Cumulative GPA: 3.58/4.00

24 semester hours completed

Bachelor of Science in Civil Engineering, University of Tennessee (August 2004)

Concentration in Environmental Engineering

Minor in Spanish

Professional Certifications:

- Engineer-in-Training (E.I.T.) certified by the Tennessee Board of Architectural and Engineering Examiners
- Tennessee Department of Environment and Conservation (TDEC) **Level II** Design Principles for Erosion Prevention and Sediment Control for Construction Sites
- Occupational Safety and Health Administration (OSHA) Construction Awareness 10-hour Course

Computer Experience:

- Microsoft Office, LibreOffice, OpenOffice.org (Office Suites)
- Microsoft Windows, GNU/Linux (Operating Systems)
- AutoCAD, LibreCAD (2D CAD)
- HEC-RAS
- ArcGIS (ArcMap), QGIS
- GNU Octave/MATLAB and The R Project for Statistical Computing (Numerical Computation Applications/Programming Languages)
- MariaDB/MySQL (Database)

Experience:

Transportation Project Specialist, December 2016 – Present

Tennessee Department of Transportation (TDOT) Environmental Division Ecology and Permits Office,
Permits Section
Nashville, TN

Responsible for obtaining environmental permits associated with water resource alterations to waterbodies (creeks, rivers, springs, streams, wetlands, and wet weather conveyances), impacts to potential sinkholes, and stormwater management [National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Permit] for transportation projects from federal and/or state environmental agencies, including the U.S. Army Corps of Engineers, TDEC, and the Tennessee Valley Authority; review water resource information provided by the TDOT Ecology Section and transportation engineering plans to determine potential water resource impacts, permit requirements, and the type of permits needed; review project design plans and provide assessments of the proposed impacts that specify changes which are required to the plans to meet all the environmental requirements necessary for permit application; identify and locate on construction plans the proposed impacts to jurisdictional water resources in the form of a permit assessment to describe the extent of the construction-related impacts and any required mitigation for the proposed project impacts; attend field review meetings to address environmental requirements and concerns; and after receiving revised project plans, review them to ensure all environmental issues have been addressed prior to permit application.

Compile supporting documentation from several different sources to prepare a permit application, including reviewing the mitigation plan provided by the TDOT Mitigation Office and the Stormwater Pollution Prevention Plan; and provide the application to the supervisor for approval.

Address comments and/or concerns from the regulatory agencies after submitting permit applications to them; draft or compile e-mail responses and appropriate documentation; coordinate with regulatory agencies to help ensure timely permit actions.

Following permit issuance, review the permits for errors; distribute the permits to TDOT personnel; and when construction impact changes are necessary, review documentation provided by construction personnel, resolve environmental issues, and/or apply for permits/permit modifications.

Update the database with relevant information regarding the receipt of permits, plans & project-related communication with other TDOT personnel, regulatory agencies, etc.

Upload project documents to the online file storage system.

Coordinate with TDOT Design and Operations (Maintenance and Construction) to provide clarity of permit requirements and resolve environmental issues identified during the construction phase of TDOT projects.

Coordinate and/or consult with staff from various TDOT areas: Design and Operations (Maintenance and Construction), the Environmental Division {Environmental Analysis Office, Environmental Mitigation, Ecology Section, other staff in the Environmental Permits Section},

Right-of-Way (ROW) Division, Structures Division Hydraulic Design Section, and Roadway Design Division to accomplish project objectives (obtaining permits and maintaining environmental compliance during the construction phase of the projects).

Maintain a comprehensive, current knowledge of applicable laws/regulations; maintain an awareness of new trends and advances in the civil & environmental engineering profession; read professional literature; attend workshops, conferences, and training sessions.

Adjunct Professor, August 2016 – Present

August 2015 – December 2015

August 2013 – December 2014

Tennessee State University (TSU) Civil and Architectural Engineering Department
Nashville, TN

Prepare students to take the NCEES Fundamentals of Engineering (FE) Examination through teaching test-taking strategies and effective methods to solve a variety of engineering problems.

Mentor both undergraduate and graduate students with regards to both academic and career goals.

Instructed students in the Theory of Structures I (Structural Analysis) course, which is about the analysis of statically determinate and indeterminate structures.

Taught Structural Testing Laboratory, which is about the design and testing of concrete mixes.

Instructed students in the Freshman Engineering Seminar course which introduces the following topics: Personal and Engineering Ethics (including discussing current issues such as the Fukushima Daiichi and Daini nuclear power plant explosions & the General Motors parts recall), the path to PE licensure, Problem solving, computer programming with R and MATLAB/GNU Octave, Statistics and Probability (including the analysis of product failure rates), Engineering Economics, and Communication.

Participated in Department meetings and made improvement recommendations to the Department Chair.

Scientist II, July 2013 – July 2015

Cherokee Nation Technology Solutions, LLC (CNTS)

Nashville, TN

Worked on assignment for the USGS Lower Mississippi Gulf Water Science Center, Tennessee Office (formerly the Tennessee Water Science Center) assisting them with data management and analysis & computer modeling.

Created and provided R Trainings for both Tennessee State University students/faculty & USGS colleagues to help them learn the R programming language.

Developed computer models, in R, based off of models created in Microsoft Excel spreadsheets, to calculate the water-surface forced evaporation and long-term average hydroelectric-reservoir evaporation for surface-water based (lake, pond, and river) thermoelectric power plants. Presented the results to my supervisors.

Verified the location of Southeast National Pollutant Discharge Elimination System (NPDES) wastewater discharge locations in ArcMap for inclusion in the SPARROW (SPATIally Referenced Regressions On Watershed attributes) model. Researched EPA databases to confirm the presence of site locations. Presented the results to my supervisor.

Created R programs to aid in the computation of sediment concentrations and loads at 12 Tennessee Department of Transportation (TDOT) streamflow stations for which turbidity and sediment data are available. Presented the graphical results to my supervisors.

Produced R programs to calculate the mean and median depth at approximately 5,000 USGS stream gaging stations. Presented the results to my supervisor.

Programmed and troubleshooted R codes while using the Exploration and Graphics for RivEr Trends (EGRET) R-package [which includes the water-quality method Weighted Regressions on Time, Discharge, and Season (WRTDS)] for the analysis of seasonal changes in nutrient loading and stream flow for South Carolina sites used in the SPARROW model. Presented the results to my supervisor. Suggested recommendations for reducing the nutrient loading from agricultural sectors by using biologically-based farming techniques.

Physical Science Technician, May 2012 – April 2013

August 2011 – September 2011

USGS Tennessee Water Science Center

Nashville, TN

Created maps in ArcMap to display the temporal seasonal variations for the South Carolina region using results from the USGS SPARROW (SPATIally Referenced Regressions On Watershed attributes) dynamic model. Compiled the maps in a PowerPoint presentation to present to my supervisor. Discussed the seasonal trends with my supervisor.

Programmed and troubleshooted R codes while using the Exploration and Graphics for RivEr Trends (EGRET) R-package [which includes the water-quality method Weighted Regressions on Time, Discharge, and Season (WRTDS)] for the analysis of seasonal changes in nutrient loading and stream flow for South Carolina sites used in the SPARROW model.

Assisted Vanderbilt University's School for Science & Math in their research project at Mammoth Cave National Park, Kentucky.

Traveled to the Mammoth Cave National Park to collect groundwater and surface water samples.

Traveled to the Hardeman County Landfill to collect mulch samples from the bioreactor. Hardeman County Landfill is the home of an unlined dump with a groundwater plume of carbon tetrachloride and other dense non-aqueous phase liquids (DNAPLs).

Performed geochemical analysis of water samples from both Mammoth Cave and Hardeman County Landfill.

Studied the desorption properties of the bioreactor mulch samples from Hardeman County Landfill.

Studied the sorption properties of ordinary mulch covered with water gathered from Hardeman County Landfill.

Analyzed the desorption properties of the bioreactor mulch samples from Hardeman County Landfill using a gas chromatography (GC) instrument.

Analyzed the sorption properties of the ordinary mulch covered with water from Hardeman County Landfill using a GC instrument.

Performed a literature search on alternative remediation strategies for the Hardeman County Landfill (composting, bioremediation, mycoremediation, etc.). Presented the study results to my supervisor.

Edited part of the report: "Evaluation of Sediment, Surface-Water, and Pore-Water Chemistry and Mussel Populations in the Clinch, Powell, Emory and South Fork Cumberland River Basins in Tennessee, Virginia, and Kentucky, 2004–2005".

Edited the Tennessee 2011 Science Center Health Table 3-5.

Graduate Student Researcher, January 2011 – August 2012
TSU Civil and Environmental Engineering Department
Nashville, TN

Researched the fate and transport mechanisms of contaminants in karst aquifer systems. - US Department of Energy National Nuclear Security Administration: Investigation of the fate and transport of contaminants in the environment. Specifically, this research involves the development of mathematical models and methodologies to model biodegradation of contaminants in surface water, streams and groundwater.

Presented research findings, as a lead author, in six research conferences and, as a secondary author, in one research conference.

Traveled to Mammoth Cave to take discharge measurements before and during a storm for later analysis in a quantitative field dye tracer study.

Oversaw the design and set-up of a quantitative dye tracer study at Mammoth Cave.

Derived a residence time distribution (RTD) function based on the gamma distribution to better model non-ideal flow, in particular karst aquifers. This allows for the determination of the time that possible contaminants will move through a system. Knowing this time can aid in the remediation of pollutants through bioremediation and/or other natural attenuation strategies.

Performed data and graphical analysis in LibreOffice/OpenOffice.org Calc and GNU Octave, which included writing GNU Octave script and function files to apply the gamma derived RTD to laboratory and Mammoth Cave field data analysis.

Performed an extensive literature search on mathematical modeling of the RTD function and the fate and transport of contaminants in karst aquifer systems.

Along with other TSU/U. S. Geological Survey-affiliated scientist and engineers, spoke to students at Cockrill Elementary School's Career Day in Nashville, Tennessee, about environmental education and our chosen profession.

Engineer-in-Training, February 2008 – June 2008

Metropolitan Nashville Government Department of Water and Sewerage Services Stormwater Division
Remedial Maintenance Section
Nashville, TN

Investigated stormwater concerns and/or complaints [damage to structures, debris in stormwater conveyances, flooding, mold, severe soil erosion, standing water (mosquitoes), streambank issues, etc.] with the property owner(s)/tenant(s) by actively listening to what they had to say. Told the individual(s) that we would place their names on a list so that their stormwater issues could be addressed in the future (when funding became available) -- some individuals had already been on the list for up to a decade or more at that time.

Wrote investigation notes; provided the notes along with recommended solutions [including the use of natural streambank stabilization (revegetation and gabions), sustainable stormwater runoff reduction options (rainwater tanks, rain barrels, bioretention/bioinfiltration facilities, including rain gardens), terracing, composting/mulching, landscaping with native vegetation, and providing the public with general stormwater education] to both the Section Head and other senior engineers for review.

Investigated construction sites on behalf of the Stormwater Division Routine Maintenance Section to assess site compliance with the EPA National Pollutant Discharge Elimination System (NPDES); created notes to be reviewed by the Section Head.

Assisted Construction Inspectors in their inspections of present and future construction projects.

Principal, November 2007 – Present
EcoC²S
Nashville, TN

Performing R programming tasks for clients -- writing code to visually show the relationships between spatial location, different bat species, and different viral communities in tables and graphs -- & myself -- the creation and maintenance of R packages {the main R package is a collection of R functions that cover 1) statistical analysis [RMS, coefficient of variation (CV), approximate and relative error, range, harmonic mean, geometric mean], 2) engineering economics (benefit-cost, future value, present value, annual value, gradients, interest, periods, etc.), 3) geometry (sphere volume and right triangle), 4) civil & environmental/water resources engineering (Concrete Mix Design for Normal Strength Concrete, Conversion of Kentucky and Tennessee Surveying Coordinates to Geospatial Coordinates, Manning's n, Gauckler-Manning-Strickler equation), 5) a version of linear interpolation for use with NAs, 6) GNU Octave/MATLAB compatible trigonometric functions in degrees, & 7) GNU Octave/MATLAB compatible size, numel, and length functions.}.

Communicate with clients about the project schedule, requirements, any issues that arise, and the results.

Creating an edible forest garden ecosystem on formerly fallow land on a family farm. We use an eclectic mixture of biologically-based techniques (agroecology, agroforestry, biodynamic and organic agriculture, companion planting, permaculture, and soil food web dynamics) to restore the health and vitality of the land.

Provided design, maintenance, and planning services to help clients grow good food for themselves, pollinators, and other wildlife.

Used various teaching strategies to help students better understand mathematics (Algebra I & II, Trigonometry, and Geometry), Beginner through Intermediate Spanish, Biology, General College Chemistry, and High School Physics.

Researched many effective sustainable design solutions to solve stormwater problems, including green roofs, grassed swales, bioretention/bioinfiltration facilities (including rain gardens), rainwater harvesting (rain barrels), etc. as a member and the Web site designer for the ASCE - EWRI Sustainable Design Water Pollution Engineering Committee (SDWPEC) – now called the ASCE – EWRI Sustainability Committee.

Made a CAD representation of a Hoop House Interior for the planting of vegetable crops.

Project Engineer, October 2005 – November 2007
Rutherford County Landfill
Murfreesboro, TN

Summary:

As an Environmental Project Engineer, responsible for the safety of the public, landfill contractors, and landfill staff while on the landfill property. Safety concerns included: air pollution (dust from the active landfill face, construction activities, and the release of methane gas due its highly combustible properties), noise pollution (heavy equipment used on the landfill property), landfill active face slope stability, landfill face haul road safety, etc. Responsible for assessing the environmental risk due to landfill operations (storm water discharge from construction areas, active and closed landfill faces; litter and dust control; possible leachate contamination of the groundwater and/or leakage into the nearby Stones River). Reviewed the construction plans for the wet detention ponds designed by the Consulting Engineer, Trent Smith. Ensured that the wet detention ponds were constructed in accordance with the specifications and engineering plans. Maintained the wet detention ponds through visual inspection before, during, and after rainfall events that to ensure that the wet detention ponds operated as designed. Verified that the wet detention ponds were not discharging silty water to Stones River. In the instances where the detention ponds were discharge silty water, recommended and oversaw the implementation of check dams directly beneath the detention pond outfall and silt fence with backing around the contours of the detention ponds to correct the turbid water discharges to the Stones River. Performed quality control checks on the EPSC BMP techniques that were implemented weekly. When the techniques had failed or were failing, ordered replacement silt fences, straw bales, shot rock, and other items to remedy the situation. Oversaw the implementation of the EPSC BMPs by the landfill staff or made the corrections myself. Discussed potential code/regulatory potential violations with the TDEC DSWM Inspectors during the quarterly inspections. Ensured that the landfill was operating within the laws governing the Class I/III/IV and tire collection programs.

Directed, oversaw, and managed landfill operations and activities. The landfill included an active Class III/IV [construction/demolition (C&D), farming, landscaping, and land clearing wastes], a post-closure Class I [commercial, domestic, institutional, and municipal solid wastes], and a tire collection/storage/transfer facility. For the first year in this position, Irucka worked closely with the County Engineer in the management of the landfill operations; however, for the remainder of time in this position, Irucka had more autonomy in overseeing the landfill operations.

Supervised and directed 4 full-time staff (2 heavy equipment operators, 1 office manager, and 1 mechanic) & 1 part-time personnel (heavy equipment operator); directed, supervised, and inspected work; processed employee concerns and problems (counseled and disciplined staff); encouraged, listened, and complimented staff; made hiring recommendations; and made salary raise recommendations.

Coordinated daily work activities; organized, prioritized, and assigned work; monitored the status of work in progress and inspected the completed work; consulted with staff; assisted with complex/problem situations; and provided technical expertise with supervision from the County Engineer. Developed work schedules to ensure adequate coverage; conducted staff training; reviewed, approved, and processed timesheets; maintained employee records.

Consulted with the County Mayor, other County employees (including other County Project Engineers, the retired Landfill Consultant, and other landfill staff), the Landfill Consulting

Engineer, and worked with the County Engineer to review department operations/activities, review/resolve problems, receive advice/direction, and/or provide recommendations. Responded to complaints and/or questions related to department operations from the public (customers), other County employees, and/or TDEC DSWM inspectors/regulators.

Performed project management and oversight; developed project conceptual drawings for the establishment of native vegetation in former borrow pit areas; used project designs and drawings developed by the Landfill Consulting Engineer; scheduled, coordinated, and oversaw construction activities; coordinated and supervised the daily activities of outside contractors; coordinated heavy equipment contracted services to accomplish landfill operation objectives.

Worked with the County Engineer, the Landfill Consulting Engineer, the Tennessee Department of Environment and Conservation (TDEC) Division of Solid Waste Management (DSWM) staff, and TDEC Division of Air Pollution Control staff to request modifications to our permit(s). Irucka was responsible for coordinating the communication between all parties. 1) Reviewed the DSWM regulations regarding landfill cover. Discussed the possibility of using an alternative daily cover (wood chips) for the active C&D landfill footprint, but DSWM chose to keep soil as the daily cover. 2) Discussed the possibility of extending the working face area of the active C&D landfill due to the increase in C&D waste after the storm clean up. Worked with the County Stormwater Project Engineer to survey the proposed active area. Calculated both the remaining landfill capacity of the active face (based off the permit conditions) & the generated waste volume that could be stored in the proposed active area. Determined the number of years of active life for the proposed active area. 3) Reviewed the DSWM regulations for burning waste. Requested a permit modification to allow the open burning of landscaping debris and yard waste within an enclosed berm rather than burying it in the active C&D landfill.

Worked with the County Engineer, the Landfill Consulting Engineer, and TDEC DSWM personnel to correct our permit violations. One violation related to stormwater runoff entering the Stones River and the second violation was for waste in water outside of the permitted area. The County Engineer decided the remediation strategies, but Irucka directed the implementation of the solutions by the landfill staff and contract heavy equipment operators. In addition, Irucka was responsible for coordinating the communication between all parties.

Worked with the Landfill Consulting Engineer to replace a groundwater pumping well cap and a groundwater pumping system. Responsible for ordering the needed supplies from the vendors. Assisted the Landfill Consulting Engineer in the proper installation of the well cap & pumping system and components.

Worked with the County Engineer, the Landfill Consulting Engineer, Tennessee Wildlife Resources Agency (TWRA), and TDEC DSWM personnel to determine the appropriate area(s) for establishing native warm season grasses (nwsg) and bushes on former borrow pit areas to minimize the soil erosion (native vegetation have deep tap roots that hold onto soil particles better than short-rooted turf grasses) and for conservation purposes (habitat and food for wildlife). Decided the planting mixes and seeding rates, in conjunction, with the native landscaping consultants. Created CAD conceptual drawings for the placement of the native

brush along with the appropriate firebreaks.

Coordinated the inspection and maintenance of the passive methane gas collection and control system. Repaired and/or replaced components of the passive methane gas collection and control system (batteries, guy wire, solar panels, etc.) either by myself or with the assistance of other landfill staff.

Managed the construction of a wet detention pond riser base and the installation of the riser & provided technical expertise in the reading of the Landfill Consulting Engineer's engineering plans and specifications.

Performed calculations to determine the size of the wet detention pond riser base.

Managed the clean-up operations of the wet detention ponds, including pumping and resurfacing with appropriate rock fill.

Surveyed Rutherford County drainage inlet/outlet structures using a Leica GPS unit to gather GIS mass points as required by the EPA NPDES Stormwater Phase II program.

Reviewed Rutherford County subdivision hydrologic and hydraulic stormwater drainage design calculations; researched United States Geological Survey (USGS) and Tennessee Department of Transportation (TDOT) drainage designs; performed hydrologic and hydraulic drainage calculation comparisons; reported findings to the County Engineer and Stormwater Project Engineer.

Coordinated the implementation of stormwater management and soil erosion prevention and minimization techniques; oversaw the continued remediation and soil erosion prevention and minimization of the landfill footprint; oversaw the application of stormwater management principles to prevent severe erosive conditions.

Maintained approved final contours and drainage systems of landfill site; maintained overall site conditions to prevent or minimize negative environmental impacts, which included dust, litter, fire, leachate release, waste release, groundwater contamination, soil erosion, and/or sediment release; corrected site conditions when negative environmental impacts occurred; ensured vegetative cover was present, where possible; approved, reviewed, and inspected both structural and non-structural best management practices (BMPs); and used soil erosion prevention and minimization & sediment control BMPs, e.g., vegetation, straw bales, straw blankets, geotextile silt fences, check dams, riprap, and native grasses.

Supervised the implementation of soil erosion prevention and minimization & sediment control devices. Oversaw the planting of native vegetation for soil erosion minimization, sediment control, and conservation.

Prepared the department budget with the County Engineer and Office Manager; made requests to modify budget line items; monitored expenditures to ensure compliance with the approved budget; reviewed and approved invoices and contractor payment requests with the supervision

of the County Engineer; consulted with State finance auditors.

Provided budget amendments and the yearly landfill budget to the County Budget & Finance Committee.

Researched and analyzed submitted bids for annual contracts and other contracted services; negotiated contracts with vendors (equipment/vehicle purchases, heavy equipment repair, etc.) and contractors (concrete construction & heavy equipment rental and labor); specified conditions for both the vendor and contractor contract awards; and recommended the awarding of the annual heavy equipment rental & labor contract to the County Purchasing Committee.

Compared the cost estimates for repairing heavy equipment versus 1) renting heavy equipment for landfill staff to operate or 2) adding an additional heavy equipment vehicle and operator to the heavy equipment contractor's contract.

Monitored the inventory of department equipment, materials, and supplies; ensured the availability of adequate materials to conduct projects and work activities; initiated orders for new/replacement materials.

Worked with the County Engineer and the County Inventory Department to sell surplus equipment.

Worked with the County Engineer to determine the structural requirements for a new, reinforced concrete shop floor with a water diversion drain and storm gate.

Provided written monthly reports to the County Public Works Committee and provided reports to both the County Engineer and County Mayor.

Communicated with county officials, employees, inmate workers, other departments, regulatory agencies, environmental agencies, outside agencies, engineers, consultants, tire dealers, contractors, vendors, the public, adjacent Class I private landfill managers and staff, Williamson County Landfill directors and managers, and other individuals to coordinate work activities, review status of work, exchange information, resolve problems, and/or give/receive advice/direction.

Protected human and environmental health by minimizing air and water pollution that left the landfill site.

Maintained state-regulated tire collection/storage/transfer facility; maintained tire recycling program; and managed truck hauling operations.

Monitored and maintained the post-closure requirements pertaining to groundwater monitoring, methane gas dispersion, and the leachate collection system in environmental compliance with TDEC regulations; coordinated with TDEC regarding the closure/monitoring program; maintained and monitored the methane gas collection and control system; analyzed laboratory results of the groundwater assessment/monitoring program and methane gas dissipation

processes reported by the Landfill Consulting Engineer; coordinated quality assurance and quality control of post-closure activities; conducted field & inspection audits to help develop and maintain landfill environmental compliance.

Ensured department compliance with the requirements of the Environmental Protection Agency (EPA), EPA National Pollutant Discharge Elimination System (NPDES) Stormwater Phase II program, TDEC, state/federal regulations, and all other applicable codes, laws, rules, regulations, standards, policies and procedures; ensured adherence to established safety procedures; monitored the work environment and the use of safety equipment to ensure the safety of employees and other individuals; and initiated any necessary actions to correct deviations and/or violations.

Maintained standards of environmental compliance as set forth by federal/state environmental regulations and conservation regulations governing the operation of a Class III and Class IV landfill, the post-closure of a Class I landfill, tire collection/storage/transfer facility, and the stormwater management program.

Made available for TDEC DSWM inspectors the permits, records, warranties, and other required documentation pertaining to Class I, III, and IV landfill facilities & the tire collection program.

Ensured that gas, groundwater, inspection, and leachate monitoring records were made available for inspection by TDEC regulators.

Reviewed the groundwater and methane gas monitoring reports to ensure the landfill complied with state/federal environmental regulations. Submitted required information and reports to the state regulatory agencies within designated timeframes.

Maintained a comprehensive, current knowledge of applicable laws/regulations; maintained an awareness of new trends and advances in the environmental engineering profession; read professional literature; maintained professional affiliations [American Society of Civil Engineers (ASCE) Associate Member; ASCE - Environmental & Water Resources Institute (EWRI) Sustainability Task Committee Web site designer and maintainer; Solid Waste Association of North America (SWANA); Rutherford County Solid Waste Ad Hoc Committee; Rutherford County Paint Recycling Research Committee]; attended workshops, conferences, and training sessions.

Notable Projects

- Groundwater pump removal and replacement
- Stormwater management for landfill
- Remediation of wet detention ponds
 - Construction of riser for wet detention pond

Volunteer Experience:

Volunteer for Science, July 2015 – Present

April 2013 – June 2013

U. S. Geological Survey (USGS) Lower Mississippi - Gulf Water Science Center (LMG WSC)
Nashville, TN

Created and maintaining R packages that contain my miscellaneous USGS R functions [processing .exp and .psf files generated by the USGS PeakFQ program, statistical error functions, "+" dyadic operator for use with NA values, creating ADAPS and QW spreadsheet files from raw USGS National Water Information System (NWIS) files, calculating saturated enthalpy, etc.]. I wrote the functions while a Cherokee Nation Technology Solutions (CNTS) United States Geological Survey (USGS) Contractor and/or USGS employee.

Developed computer models, in R, based off of models created in Microsoft Excel spreadsheets, to calculate the water-surface forced evaporation and long-term average hydroelectric-reservoir evaporation for surface-water based (lake, pond, and river) thermoelectric power plants. Presented the results to my supervisors.

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Publications:

Embry, Irucka and Roland, Victor and Agbaje, Oluropo and Watson, Valetta and Martin, Marquan and Painter, Roger and Byl, Tom and Sharpe, Lonnie (2013). Derivation of a Multiparameter Gamma Model for Analyzing the Residence-Time Distribution Function for Nonideal Flow Systems as an Alternative to the Advection-Dispersion Equation. *ISRN Chemical Engineering*, 2013, 8 pages. available at <http://dx.doi.org/10.1155/2013/539209>

Painter, Roger and Embry, Irucka and Roland, Victor and Toomey, and Sharpe, Lonnie, 2013, An Alternative to the Advection Dispersion Model for Interpreting Dye Tracing Studies in Fractured-Rock and Karst Aquifers, 99-102. ed. Trimboli, Shannon. *Mammoth Cave National Park's 10th Research Symposium: Celebrating the Diversity of Research in the Mammoth Cave Region*. available at: http://digitalcommons.wku.edu/cgi/viewcontent.cgi?article=1106&context=mc_research_symp

West, Ashley and Solomon, David and McMillan, Sean and Ho, Hung-Wai and Roland, Victor and Embry, Irucka and Toomey, Rick and Painter, Roger and Sharpe, Lonnie and Hui, Dafeng, 2013, Three Examples of Chemical Transport in Storm Runoff at Mammoth Cave National Park, Kentucky, 184-187. ed. Trimboli, Shannon. *Mammoth Cave National Park's 10th Research Symposium: Celebrating the Diversity of Research in the Mammoth Cave Region*. available at: http://digitalcommons.wku.edu/cgi/viewcontent.cgi?article=1106&context=mc_research_symp

McMillan, Sean and West, Ashley and Solomon, David and Diehl, Roger and Roland, Victor and Embry, Irucka and Toomey, Rick, III, 2013, Evaluation of Stormwater Filters at Mammoth Cave

National Park, Kentucky, 2011-12, 188-192. ed. Trimboli, Shannon. *Mammoth Cave National Park's 10th Research Symposium: Celebrating the Diversity of Research in the Mammoth Cave Region*. available at: http://digitalcommons.wku.edu/cgi/viewcontent.cgi?article=1106&context=mc_research_symp

Embry, Irucka and Roland, Victor and Painter, Roger and Toomey, Rick and Sharpe, Lonnie, 2012, Quantitative Dye Tracing--Development of a New Interpretative Method, 1C:6-16. *Proceedings from the 22nd Tennessee Water Resources Symposium* Montgomery Bell State Park, Burns, Tennessee, April 11-13, 2012.

Diehl, Roger and Toomey, Rick and Roland, Victor and Embry, Irucka and West, Ashley and Byl, Tom, 2012, Effectiveness of Stormwater Filters at Mammoth Cave National Park, Kentucky, 29-36. *Proceedings from the 22nd Tennessee Water Resources Symposium* Montgomery Bell State Park, Burns, Tennessee, April 11-13, 2012.

Hilger, Helene and Embry, Irucka, Towards a New Vision of Social Sustainability. *EWRI Currents*, Fall 2010, Volume 12, Number 4, pages 10-11. available at: https://www.ecoccs.com/Social-Sustainability_Hilger-Embry_EWRIFall2010Currents.pdf

Embry, Irucka, Social Sustainability and the Pursuit of Design in Engineering. *EWRI Environmental and Water Engineering Practice*, vol. 1, no. 1, page 5, 2011. available at: https://www.ecoccs.com/social_sustainability_EWRI_Irucka_Embry.pdf

Oral Presentations:

Embry, Irucka and Roland, Victor and Byl, Tom and Painter, Roger and Toomey, Rick and Sharpe, Lonnie. *Groundwater Hydrological Quantitative Dye Tracing - Development and Application of a New Technique*. Presented at the World Environmental & Water Resources Congress 2013 [the Environmental and Water Resources Institute (EWRI) of the American Society of Civil Engineers (ASCE) Congress 2013], Cincinnati, Ohio, on May 20, 2013.

Embry, Irucka and Roland, Victor and Kalyanapu, Alfred and Byl, Tom and Painter, Roger and Toomey, Rick and Sharpe, Lonnie. *Application of a Gamma-derived Residence Time Distribution Function for Karst Aquifers*. Presented at the 122nd Meeting of the Tennessee Academy of Science (TAS), Nashville, Tennessee, on November 16, 2012.

Embry, Irucka and Roland, Victor and Painter, Roger and Toomey, Rick and Sharpe, Lonnie with special acknowledgment to Byl, Tom D. *Quantitative Dye Tracing – Development of a New Interpretative Method*. Presented at the 22nd Tennessee Section of the American Water Resources Association (AWRA) Water Resources Symposium, Burns, Tennessee, on April 11, 2012.

Poster Presentations:

Diehl, Roger and Toomey, Rick and Roland, Victor and Embry, Irucka and West, Ashley and Byl, Tom D. *Effectiveness of Stormwater Filters at Mammoth Cave National Park, Kentucky*. Presented at the 22nd Tennessee Section of the American Water Resources Association (AWRA) Water Resources

Symposium, Burns, Tennessee, on April 12, 2012.

Embry, Irucka and Painter, Roger and Byl, Tom D. *Residence Time Distribution Model for Non-ideal Flow Derived from Independent Gamma Distributions of Tracer Travel Distance and Linear Velocity*. Presented at the 34th Annual Tennessee State University-Wide Research Symposium in Nashville, Tennessee, on March 29, 2012.

Embry, Irucka and Painter, Roger and Byl, Tom D. *Residence Time Distribution Model for Non-ideal Flow Derived from Independent Gamma Distributions of Tracer Travel Distance and Linear Velocity*. Presented at the 32nd Annual Meeting in North America of the Society of Environmental Toxicology and Chemistry (SETAC), Boston, Massachusetts, on November 14, 2011.

Embry, Irucka and Painter, Roger. *Graphical Residence Time Distribution Model for Karst Systems Using MATLAB® and GNU Octave Derived from Independent Gamma Distributions of Tracer Travel Distance and Linear Velocity*. Presented at the 21st Tennessee Section of the American Water Resources Association (AWRA) Water Resources Symposium, Burns, Tennessee, on April 14, 2011.

Affiliations and Memberships:

Environmental & Water Resources Institute (EWRI) of the American Society of Civil Engineers (ASCE) Sustainable Engineering Practices Committee [Sustainability Task Committee]

American Society of Civil Engineers (ASCE)

Awards and Honors:

NSBE Region III Academic Pyramid of Excellence (APEX) Honors, August 2012

Tennessee State University College of Engineering Certificate of Achievement for Outstanding Leadership and Academic Achievement, Civil and Environmental Engineering awarded on April 27, 2012

First Place, Graduate Poster in the Category of Engineering at the 34th Annual Tennessee State University-Wide Research Symposium on March 30, 2012 [Residence Time Distribution Model for Non-ideal Flow Derived from Independent Gamma Distributions of Tracer Travel Distance and Linear Velocity]

R Trainings Conducted (<https://www.ecoccs.com/rtraining.html#tut>):

A Practical Introduction to the R Programming Language Part 6: Basic Operations Using R. Presented on 28 August 2015 by Irucka Embry, EIT.

A Practical Introduction to the R Programming Language Part 5: Data Visualization with R. Presented on 27 March 2015 by Irucka Embry, EIT.

A Practical Introduction to the R Programming Language Part 4.

Presented on 12 March 2015 by Irucka Embry, EIT.

A Practical Introduction to the R Programming Language Part 2 and 3.

Presented on 24 June 2014 and Presented on 9 September 2014 by Irucka Embry, EIT.

A Practical Introduction to the R Programming Language Part 2.

Presented on 24 June 2014 by Irucka Embry.

A Practical Introduction to the R Programming Language.

Presented on 21 August 2013 by Irucka Embry, EIT & Jennifer Murphy.

Professional Training & Conferences:

2018 Tennessee Stormwater Association (TNSA) Annual Conference

October 15-17, 2018

27th Tennessee Section of the American Water Resources Association (AWRA) Water Resources Symposium

April 11-13, 2018

The University of Tennessee Water Resources Center/Tennessee Department of Environment and Conservation (TDEC) Level II Design Principles for Erosion Prevention and Sediment Control for Construction Sites

December 12-13, 2017

Tennessee Department of Transportation (TDOT) Occupational Safety and Health Administration (OSHA) Construction Awareness 10-hour Course

November 8-9, 2017

2017 Tennessee Stormwater Association (TNSA) Annual Conference

October 17-19, 2017

Tennessee Department of Transportation (TDOT) Erosion Prevention and Sediment Control Training

October 10, 2017

26th Tennessee Section of the American Water Resources Association (AWRA) Water Resources Symposium

April 5-7, 2017

Tennessee Department of Transportation (TDOT) Fundamentals of Erosion Prevention and Sediment Control (EPSC) Level 1 Training

February 21-22, 2017

Contract Plans Reading Course

February 10, 2017

TDOT Environmental Division Stormwater Pollution Prevention Plan (SWPPP) Training
December 14, 2016

Tennessee Nutrient Reduction Framework
May 21, 2015

Geoprocessing in R
March 25, 2015

Data-driven Geospatial Visualization with Cesium
January 22, 2015

2014 Tennessee Section of the American Water Resources Association (AWRA) Green Infrastructure
and LID Seminar
June 20, 2014

23rd Tennessee Section of the American Water Resources Association (AWRA) Water Resources
Symposium
November 4-6, 2013