

A-Professional Preparation: Degrees, Training and Certifications

- Diploma in Chemical Engineering, Universidad Nacional del Litoral, Santa Fe, Argentina, 1977
- Training, National Council of Research, CONICET, Argentina-Postgraduate Studies, 1978-1983
- Certificate of English Studies, Anglo Continental School of English, Bournemouth, UK, 1981
- Master of Science, Chemical Engineering, Purdue University, West Lafayette, IN 47907-USA, 1987
- Ph. D., Chemical Engineering, Purdue University, West Lafayette, IN 47907-USA, 1990
- Regents Academic Leadership Certificate, Chair Academy and Tennessee Board of Regents, 2007
- Certificate of Advanced Academic Leadership, Chair Academy, 2010.
- Certificate of Provost Leadership Development Program, Tennessee Technological University, 2015.

B- Major Appointments

- 2010- Present; University Distinguished Faculty Fellow, Tennessee Technological University, TTU
- 2003-Present; Professor of Chemical Engineering, Dept. of Chemical Engineering, TTU
- 2003-2019; Chairperson, Department of Chemical Engineering, TTU
- 1995-2002; Associate Professor, Dept. of Chemical Engineering, FAMU-FSU¹ College of Engineering
- 1990-1995; Assistant Professor, Dept. of Chemical Engineering, FAMU-FSU College of Engineering
- 1987-1990; David Ross Graduate Fellow, School of Chemical Engineering, Purdue University
- 1983-1987 International Postgraduate Study Fellow, CONICET², Argentina-Purdue University
- 1983-1990; Member of the Technological and Scientific Researcher Career, CONICET-Argentina
- 1978-1983; Lecturer, Universidad Nacional del Litoral, UNL, Santa Fe, Argentina-Part-Time
- 1978-1983; Postgraduate Study Fellow, INTEC³-UNL, CONICET, Santa Fe, Argentina
- 1973-1977: Lab Instructor and Program Director (Interim, last year), Physicalchemistry Department, Facultad de Ingeniería Química (FIQ), UNL, Santa Fe, Argentina

C- Mentoring Efforts

During his academic career (at Florida State University, Florida A&M University, and Tennessee Technological University), Dr. Arce holds a strong record of mentoring students. For example, he has been/is the mentor/co-mentor of one hundred ninety one (191) research and educational projects including the following categories: High School projects (5), undergraduate Honors/Distinction in the Major/ Senior Thesis (29), Master of Science Theses (37), Doctoral Dissertation (28), postdoctoral associate projects (12), undergraduate (non-thesis) research projects (41), graduate (non-thesis) research projects (16), and summer undergraduate research projects (23). A significant number of these projects are with *underrepresented student populations including women, first time college rural students, latino, and African American*. Further, his students have distinguished themselves in academia, national labs, and industrial positions. *Twenty-one of his former students and faculty mentees* are members of academic organizations either as faculty or administrators in the USA, Argentina, South Korea, Chile, and Perú.

D-Developmental Activities in Professional Societies

Dr. Arce has an extensive (solo and team) participation at presenting workshops and training seminars at the annual meetings of the American Society of Engineering Education (ASEE), both regional (SE) and national meetings as well as the American Institute of Chemical Engineering (AIChE). These efforts have been focused on training engineering faculty and schoolteachers in the *High-Performance Learning Environments (Hi-PeLE)* and, more recently, in the *Renaissance Foundry Model (RFM)*, both guiding learning platforms developed under his leadership and winners of multiple awards. Collectively, these platforms have taken over two decades in the development, implementation, and assessment. The RFM is part of the guiding strategy for faculty development at TTU and it is the educational model for the \$3M NSF-NRT program "*Engendering the Spirit of Gadugi at the FEW Nexus*." (See Section I-Fund Raising Efforts).

¹ Florida A&M University- Florida State University (FAMU-FSU), Tallahassee, FL

² National Research Council of Argentina (CONICET)

³ Research Institute for Chemical Technology (INTEC); UNL, Santa Fe, Argentina

E-Professional Societies: Membership and Service

1. American Society of Engineering Education (ASEE); Life Member(pending)-Former Chair of the Administrative Division of the ASEE-SE- 2. American Institute of Chemical Engineers (AIChE); Senior Member-3. Sigma Xi, The Research Society- 4. The Chair Academy; Life Member- 5. Society of Hispanic Professional Engineers (SHPE)-6. Society of Women Engineers (SWE)- 7. Purdue Alumni Association; Life Member-8. Royal Society of Chemistry; Cambridge, UK- 9. The Association of Environmental Engineering and Science Professors (AEESP). 10. Former member of the American Electrophoresis Society (AES); during his time as a member of the AES Board of Directors, he played a vital role in helping the society to become financially stable. As part of this effort, AES became a member of a dedicated forum within the AIChE where young professionals interacted efficiently with more senior members. As part of these efforts, Dr. Arce has also been the facilitator or co-facilitator of numerous educational and technical workshops for these national and international organizations. 11. Member of numerous review panels for the NSF and member of the onsite visiting team, ERC-NSF-Program.

F- Publication Board of Peer-Reviewed Journals

1. Journal of Chemical Engineering Education; Two consecutive two-year terms- 2. Brazilian Journal of Chemical Engineering (current member)- 3. Environments (MDPI, current member)- 3. Recent Patents in Biotechnology (Bentham House Publishers; current member)- 4. Critical Conversations (Tennessee Board of Regents, TBR).

G-Publications and Other Releases

Dr. Arce has authored or co-authored more than one hundred and fifty peer-reviewed publications, technical and educational proceedings, and invited book chapters in his focused areas of research and engineering education. He has delivered more than three-hundred fifty technical and educational presentations (with students and collaborators) and more than seventy invited, keynote or plenary lectures in the United States of America, South America, and Europe. *Five of his publications in engineering education have received the prestigious Thomas C. Evans Award from the ASEE-SE for the most outstanding paper in engineering education making him the only faculty in the history of the award to received it five times.* Dr. Arce is the co-inventor of five patents or patent disclosures with his students and collaborators, and he has numerous public release communications from both FSU & TTU about educational innovation and mentoring.

H- Honors, Awards and Distinctions (Selected)

1. Royal Society of Chemistry, Cambridge, UK: Elected Fellow for extensive contributions to education, research, and service to the chemical engineering sciences (2022).
2. Tennessee Technological University: *Scholar Mentor Award* for excellence in scholarly and student/faculty mentoring efforts (2022).
3. Davidson School of Chemical Engineering, Purdue University, West Lafayette, IN-USA: Outstanding Chemical Engineer Alum Award for leading role in the new type of engineer and the Renaissance Foundry Model of innovative-centered education (2021).
4. American Society of Engineering Education, SE: Thomas C. Evans Award for the most Outstanding Paper in Engineering Education (1994, 2001, 2008; 2014, and 2021).
5. American Society for Engineering Education (ASEE): Region-II Best Paper Award for the development of the Renaissance Foundry Model (2015).
6. Tennessee Technological University: Caplenor, most prestigious award for excellence in research (2015).
7. Chair Academy: Dr. I. Karre Award for outstanding "On Campus Leadership" (2009, 2014).
8. National Science Foundation- Engineering Research Center Annual Meeting-Keynote Lecturer on "The Composer Style Engineer as a Model of Innovation" (2009, Washington, DC).
9. Board of Regents, Florida University System. Teaching Incentive Program Award (TIPA) for Excellence in Teaching. Most prestigious award for Excellence in Teaching, 1994-1995.
10. Fulbright Faculty Developmental Program for Latin America. Invited Panel Reviewer and Lecturer (Chile, Paraguay, and Uruguay), 1994.

I-Fund Raising Efforts (Highlights)

Dr. Arce has been awarded in private, state, federal and international government sources *approximately \$8M in USA dollars* for supporting his research and educational efforts. Examples most relevant to mentoring and educational efforts include: 1. Venture Well Foundation, “*BioFoundry Design: Leveraging Biomimicry to Advance Environmental and Social Sustainability Innovation in Prototypes Developed in Foundry-Guided Undergraduate Chemical Engineering Courses*” (PI; \$30K, Summer 2020. Funded). Please see Interview at: <https://venturewell.org/chemical-engineering/>. 2 TBR SERS, *The Holistic Foundry Undergraduate Engaged Learners (FUEL)*, Summer 2020 Renaissance Foundry Research Group, (Co-PI.; \$50K, Funded). 3. The National Science Foundation, NRT-FW-HTF, “*Engendering the Spirit of Gadugi at the Food-Energy-Water Nexus*,” PI Total \$3Mx 5yrs. Awarded. *Starting date: July 1, 2022.* (Please see PR at: <https://www.tntech.edu/news/releases/22-23/tech-awarded-3-million-nsf-grant-for-work-in-food-energy-and-water-resources-in-rural-communities.php>)

J-Areas of Research Focus:

Dr. Arce key area of research is in *Environmental Catalysis* with applications to the wastewater decontamination via advanced oxidation methods; of particular interest is the elimination from water of organic and biopharmaceutical molecules. He is the Director of the newly funded “*Environmental Catalysis Research Laboratory*” at Tennessee Technological University that houses state of the art equipment to conduct research in photo and electrocatalysis as well as in the application of pulsed corona discharges to promote the oxidation of the contaminants. Dr. Arce’s research group is credited with pioneering efforts for the elimination of large molecular weight contaminants from water; the use of electrokinetic approaches for soil decontaminations, and the engineering modelling for materials used in electrical-powered vehicles.

Other areas of research interest include: **NANOSTRUCTURED MATERIALS-*With Functional Performance*** (Health Care Engineering Applications: Hydrogels for clinical diagnostics, wound healing, tissue scaffolds and assisted drug delivery)- **MATEMATICS-ASSISTED-MEDICINE APPROACHES (MAMA)-*Applications to Biophysical Systems*** (Microcirculatory and renal system pathologies, arterial stenosis, kidney failure, cancer treatment by hyperthermia and chemotherapies-**ENGINEERING EDUCATION:** (Collaborative-, Creative- and Innovation-Driven Learning; Constructionistic Approaches; Students-Faculty Partnerships).

K-Research Philosophy and Mentoring

The twenty-first century has accentuated the new reality: Demand for long-lasting solutions to Grand Challenges (USA-NA, 2017) and professional adaptability to the globalization of the economy across countries with highly dissimilar levels of resources (Florida, R., 2012). This requires a completely different strategy for the development of a new type of Science, Technology, Engineering, and Math (STEM) professional at the postsecondary level: one that is holistically skillful, adaptable, impactful to society’s challenges, and entrepreneurial (Grasso et al., 2008; National Academy of Science [NAE], 2004; Sochacka et al., 2016). To respond to this challenge, Dr. Arce (with students and collaborators) have focused on building a constructionistic-centric approach, i.e., the *Renaissance Foundry Model*, RFM, (Arce et al., 2015) that provides a tool for facilitating the formation of such new STEM professional. Guided by the RFM, Dr. Arce strives to create learning and research environments that can efficiently foster the development of such *holistic* STEM professional.

L- Contact Information

Pedro E. Arce, PhD, FRSC
University Distinguished Faculty Fellow
Environmental Catalysis Lab, Director
Email: Parce@tntech.edu
Work Phone: 931-372-3267
Tennessee Technological University
1020 Stadium Drive
Cookeville, TN-USA 38505