

Francis A. Di Bella

Professional Engineer, Director of Engineering Technology,
Academic Specialist, Program Coordinator of Mechanical Engineering Technology.

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EDUCATION:

- 1974 B.S., Mechanical Engineering, Northeastern University
- 1975 M.Eng., Mechanical Engineering, Rensselaer Polytechnic Institute
- 1992 – 1997 Electrical Engineering Grad. Courses in Power Engineering (2 courses from Graduate Degree before Program eliminated)

ACADEMIC EXPERIENCE:

- 2005 – Present Director of Engineering Technology, Academic Specialist
Instruction in Thermo-Fluids-Heat Transfer, Dynamics, Machine Design and Creative Product Design and Development courses, Capstone Project Design Course for seniors. ABET MET Assessment Statistics Coordinator.
- 2000 – Present Mechanical Engineering Technology Program Coordinator for the School of Engineering Technology and the Lowell Institute School at Northeastern University
- 2000 – Present Faculty Advisor for Mini-Baja, NUMCAA, FIRST
- 2000 – 2005 Assistant Professor
Instruction in Thermo-Fluids-Heat Transfer, Dynamics, Machine Design and Creative Product Design and Development courses, Capstone Project Design Course for seniors.
Faculty member on committee to draft curriculum for the new School of Technological Entrepreneurship at Northeastern University and future Instructor for the new School; passed by Faculty Senate in April 2004. ABET MET Assessment Statistics Coordinator.
- 1987 – 1999 Evening Instructor, Northeastern University; Mechanical and Industrial Engineering Dept. and Lowell Institute School; Instructed undergraduate, evening courses in Thermodynamics I and II, Refrigeration and Air Conditioning System Design, Heat Transfer
- 1983 – 1987 Evening Instructor at Franklin Institute of Boston
Instructed undergraduate, evening courses in Heat transfer, Thermodynamics, Fluid Dynamics and Mechanical Engineering Laboratory

ACADEMIC AWARDS:

- University Wide Excellence in Teaching Award in 2002
- College of Engineering Excellence in Teaching Award in 2004
- The Lowell Institute School at Northeastern University Teaching Award in 2000, 2002 and 2005

PROFESSIONAL ENGINEERING EXPERIENCE:

2000 – Present Principal, **ARGO-Millennium Engineering Ventures**. Mechanical Engineering Consultation. (fjrcdibella@msn.com; 617-363-0541)

1997 – 2000 Thermedics Detection Inc., A Subsidiary of Thermo Electron Corporation; R&D and Project Engineering Manager for the InScan (X-Ray) product line. Manage all R&D and production engineering requirements for the InScan product. The InScan systems(s) provide quality control diagnostics for packaged products; measuring liquid level, volume, weight and foreign body (contamination) detection. The principle of operation includes X-ray technology and image processing via computer algorithms. Responsible for expanding the product line into new applications. Prepared Technical proposal and assisted in design and fabrication of a laser heating and evaporative cooling (hand held) apparatus for applying medical treatments to sub-dermal tissues. Prepared Technical Proposal and Program Manager and project engineer for Special R&D Project (in progress) for determining leaking containers for minute dosages of pharmaceuticals.

1976–1997 Tecogen Inc., A Subsidiary of Thermo Electron Corporation
Director of Advanced HVAC and Power Systems
Program Manager for various Department of Energy and private contract R&D projects including: super heated, steam atmosphere drying concepts for industrial and municipal waste products and sludges, steam heat pumps, district heating applications of heat activated desiccant cooling systems and organic Rankine-cycle bottoming systems. Responsibilities of group Director included the preparation and presentation of Technical Proposals and origination of innovative concepts for Energy Systems leading to the development of viable products for manufacturing by Thermo Power Corp. or its representatives.

February 1985 Certified Professional Engineer in Massachusetts. Certificate No. 32115

PATENTS:

- Five U.S. patents (6,167,751 ; 5,454,408 ; 5,291,668 ; 4,733, 536; 4, 729,774)
- One U.S. Patent pending in field of renewable energy
- Four patent disclosures at Northeastern University (Fluidic Mattress for Premature Infants in Neonatal Care Units, Road Rage Instrument; Thermal Air Chimney for Geo-Physical Phenomenon; Nano tube Instrument for in vivo Cancer Detection in Cells)
- Numerous technical publications, Final Reports and seminar/conference presentations regarding sponsored R&D projects in the field of thermodynamics, thermal and engine systems design, heat transfer and heat exchanger components.

Patent Status

In addition to the patents issued during my professional engineering experience, NU's Dept. of Tech. Transfer has issued a Patent Disclosure for my concept for renewable energy recovery using solar energy and an air chimney-type design concept but returned patent rights to me and a co-inventor. A patent is pending contingent upon negotiations with USPTO that are in progress.

PUBLICATIONS:

- Publications Printed and Donated to Students as a Classroom Text:
“Engineering Design Lessons Taught and Learned: The SANDMAN PROJECT. An Example

of the Application of the Design Process Methodology”

“An Instructional Primer on the use of Spreadsheets as a Tool to Solve Significant Problems in Physical Sciences and Engineering Technology”

- Manuscripts in Progress:
“Essays on the Engineering Life Contemplated”
“Leonardo’s Gift: An Engineering Roman a Clef”
“See You in the Funny Pages: Movies and Comics viewed from an Engineering Vantage Point”
- Conference Papers and Journal Article since 2000:
Journal Article: Di Bella, F.A., Gwiazda, J; “A New Concept for Integrating a thermal air power tube with solar energy and alternative, waste heat energy sources and large natural or man-made, geo-physical Phenomenon”; *Renewable Energy* (Elsevier) 30 (2005) pages 131-143
- **Di Bella, F. A. ;** “C.S.I. Engineering Technology: Directing Engineering Technology Curriculum to Solve Real-World Engineering Problems”; **Proceedings 2005 ASEE Annual Conference, Portland, Oregon. Session 2249**
- **Di Bella, F. A. ;** “See You in the Funny Papers: Attempting to rectify Student’s Long-Standing False Intuitions of Engineering Science”; **Proceedings 2005 ASEE Annual Conference, Portland, Oregon. Session 2247**
- **Di Bella, F. A. , Tapper, J.;** “Integrating Electrical and Mechanical Engineering Technology Lab Applications in a Hands-On Approach”; **Proceedings 2004 ASEE Annual Conference, Salt Lake City, Utah**
- **Di Bella, F. A. , Chamarro III, A ,** “*Optimizing Thermal Energy Storage for Cogeneration Applications: A Faculty and Engineering Technology Student Collaboration*”, **Proceedings 2004 ASEE Annual Conference, Salt Lake City, Utah, Paper 2004-376, CD-ROM.**
- **A New Concept for a Thermal Air Power Tube used with Concentrated Solar Energy Power Generation in Open-Pit Mines and Large Natural Geo-Physical Phenomenon** (Paper No.: IJPGC2003-40071); **A.S.M.E. 2003 INTERNATIONAL JOINT POWER GENERATION CONFERENCE June, 2003 ;** Francis A. Di Bella, PE, M.E.T. Assistant Professor Northeastern University (Boston, MA.) and **Mr. Jonathan Gwiazda (gwaz@yahoo.com)** Electrical Engineering Northeastern University
- **Di Bella, F., and Gwiazda, J.,** “A Novel Thermally Induced Draft Air Power Generation System for Very Tall, Man-Made and Natural Geo-Physical Phenomenon,” **Proceedings 2002 ASME International Mechanical Engineering Congress and Exposition, New Orleans, Louisiana. November 2002, pp. 2609801-09, CD-ROM**
- **Di Bella, F. A. and Gregorian, G.,** “*New Paradigms in Energy Conservation and Power Generation for the World’s Tallest Buildings,*” **Proceedings 2001 ASEE Annual Conference, University of New Mexico, Albuquerque, New Mexico, June 2001, pp. 233301-15, CD-ROM.**
- **Di Bella, F. A.,** “*The Use of Spreadsheets for Significant Engineering Analysis in Engineering Technology and Physical (and Natural) Science Courses: The Development of an Instructional Primer of Spreadsheet Solution Techniques in Applied Mechanical Engineering Technology Subjects,*” **Proceedings 2001 ASEE IMECE, New York City, New York, November 2001, pp. 11-17, CD-ROM**

- **Di Bella, F., and Kane, S.,** “*Northeastern University’s Cooperative Education Program for Engineering Education: Strong and Alive after 100 Years and Continuing to Contribute to the Tradition of Engineering Education,*” **Proceedings 2002 ASEE Conference for Industry and Education Collaboration**, Sarasota, Florida, February 2002, pp. 44421-15, CD-ROM.
- **Di Bella, F.,** “*Teaching Engineering Ethics in Mechanical Engineering Design Projects,*” **Proceedings 2002 ASEE Annual Conference**, University of Montreal, Montreal, Quebec, Canada, June 2002, pp. 256631-35, CD-ROM.
- **Di Bella, F.,** “*Evaluating and Grading Student Course Work Product Design: A Creative Approach,*” **Proceedings 2002 Frontiers in Education Conference**, Worcester Polytechnic Institute, Boston, Massachusetts, November 2002, pp. T3B01-11, CD-ROM.
- **Di Bella, F. A., Varghese, T., and Shea, M.,** “*A Three-Dimensional Perspective on a Capstone Project – Instructor, Student and Industrial Sponsor,*” **Proceedings 2001 ASEE Conference for Industry and Education Collaboration**, San Diego, California, January 2001, pp. 44611-17, CD-ROM.
- **Di Bella, F. A.,** “*The Effectiveness of Adjuncts in Modern Engineering Education,*” **Proceedings 2001 ASEE Conference for Industry and Education Collaboration**, San Diego, California, January 2001, pp. 54231-38, CD-ROM.
- **Di Bella, F. A.,** “*Exploring Personal, Hyper-Actions in Engineering Ethics,*” **Proceedings 2001 ASEE Annual Conference**, University of New Mexico, Albuquerque, New Mexico, June 2001, pp. 2525401-411, CD-ROM.
- **Di Bella, F. A. and Isaacson, M.,** “*The Sandman Project: An Example of the Teaching of the Design Process Methodology,*” **Proceedings 2001 ASEE Annual Conference**, University of New Mexico, Albuquerque, New Mexico, June 2001, pp. 25251901-1927, CD-ROM.
- **Di Bella, F. A., Denn, P., Friar, J., and Meyer, M.,** “*The Development of a School of Technological Entrepreneurship at Northeastern University for Multi-Discipline, Undergraduate and Alumni Participation,*” **Proceedings 2001 ASEE North Midwest Section Annual Conference**, University of North Dakota, Grand Forks, North Dakota, September 2001, pp. 11-17, CD-ROM.

BIOGRAPHICAL SUMMARY:

Prof. Francis A. Di Bella is an Assistant Professor in NU’s School of Engineering Technology and a Registered Professional Engineer in Massachusetts. Prof. Di Bella has a BS. ME from Northeastern University (Cl. of 1974), a Masters in Mechanical Engineering from Rensselaer Polytechnic Institute (Cl. of 1975) and he has taken Graduate classes at Northeastern University towards a graduate electrical engineering degree in Electrical Power Systems.

After graduate school Prof. Di Bella was hired by his previous NU Coop employer, the Thermo Electron Corp. and for 25 years worked in corporate and contract Research and Development during the height of the energy crisis of the 1970’s to design and development advanced energy systems and products. These advanced energy systems ranged from micro-cogeneration systems and power boost systems for long haul vehicles using waste heat recovery to superheated steam dryers for recovering fertilizer-grade products from anaerobic digester systems and the design of gas engine driven, water-chiller and compressed air systems. His professional engineering career was enhanced by the occasional (Adjunct) teaching assignment at N.U. until the passion for teaching the ‘art and science’ of engineering began to match his passion for practicing engineering and he joined the faculty of The School of Engineering Technology as a full time, Assistant Prof. starting in Sept., 2000.

His professional and academic engineering research interests involve the practical, engineering applications of any and all innovative energy systems that utilize renewable or recoverable energy resources in novel ways. Imagine for example, the transformation of an abandoned, open-pit mineral mine into a concentrating, solar energy collector and the generation of electric power from the focused energy or the use of a mile deep, abandoned coal mines to generate wind energy thermally powered by the earth? Or a hybrid-electric vehicle that uses heat recovery to keep the batteries warm and thus improving the driving range while also generating electric power from the engine's new micro-turbo charger/electric generator aux. power system.

But Prof. Di Bella's most recent academic interest is the use of the Mechanical Engineering Design Process to train his students in not only the 'art and science' of engineering design but in so doing also help them gain self-confidence, creativity, commitment, competence, communicative skills and to appreciate the importance of culture and character in their professional as well as in their personal lives. The Senior Design project is seen as the perfect venue for this activity where the previous years academic instruction becomes the basis for the student's first major foray into completing a significant engineering project.

To help formalize this process Prof. Di Bella is participating with several business and engineering faculty who are similarly committed to the planning of a Technological Entrepreneurial School at NU. This will be where business and engineering students can meet (in what has been billed as the proverbial clashing of two worlds!) for the first time in the classroom and not later for only the first time when they meet in the business world to actually begin an entrepreneurial enterprise. In this manner, the students will at least sample the business and engineering expertise of these two cultures BEFORE leaving the University. The first year's crop of business-engineering student entrepreneurial projects ran the gamut from: a shopping (utility) carriage that is designed to be folded and stored into an S.U.V. until it is needed, a power boost system for an automobile engine that utilize the onboard A/C, an instrumented training oar for NU's champion rowing teams and a geriatric chair-to-bed lifting device and an easier to use and more versatile electric transporter for elderly and the handicapped.

With the assistance of several Provost Grants, Prof. Di Bella has also encouraged undergraduate research for several students who have worked with him on projects that include the preparation of an Instructional Primer for using spreadsheets to solve significant engineering and physical science problems, the preliminary design of a fluidic mattress for sedentary patients and the study of energy recovery and generation from man-made and naturally occurring geo-physical structures.