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BRIEF PROFESSIONAL PROFILE

Dr. Ghiocel is currently the President and Chief of Engineering with Ghiocel Predictive Technologies, Inc. with main office in Rochester NY. Ghiocel Predictive Technologies, Inc. (<http://www.ghiocel-tech.com>) is a small business corporation specialized in computational modeling and prediction for high-complexity of engineering problems. Before starting Ghiocel Predictive Technologies, Inc., Dr. Ghiocel had the position of Vice President of Advanced Engineering Applications at STI Technologies, Inc., Rochester, NY (<http://www.sti-tech.com>). Dr. Ghiocel has more than 25 years of extensive research lab, university research and consulting engineering experience in advanced computational structural/mechanical analysis for systems and components, structural dynamics, seismic soil-structure interaction (SSI), damage mechanics, probabilistic risk assessment and component life prediction. Dr. Ghiocel has accumulated a large experience on practical implementation and use of advanced engineering computational approaches by performing probabilistic risk assessment reviews for large, complex systems such as nuclear facilities, aircraft structure and jet engine systems. Dr. Ghiocel immigrated in United States from Romania in 1991. He is a US Citizen since 2001.

Nuclear Industry Consultant Experience

Over years, Dr. Ghiocel has performed many projects for nuclear facilities for power and defense industries. He has offered consulting services for structural analysis and design of reinforced concrete, steel and masonry structures, fragility (risk) analyses and risk assessment for nuclear power plant (NPP) structures, stochastic modeling of loads and material behavior, nonlinear finite element analyses, design optimization, dynamic soil-structure interaction. He started to work for nuclear industry since 1982, in Romania. In 1982, he was the technical lead engineer for an important nuclear project DCD study that investigated the seismic SSI behavior the CANDU 700 Mw NPP for soft soil conditions. He was involved in CANDU related projects until 1990. In 1986, he was appointed the Nuclear Division Manager of the Romanian Construction Industry Central Laboratory with focus on the QA aspects for the NPP Cernavoda Unit 1-5.

After he completed his Ph.D degree in Structural Engineering in 1993 in USA, he joined Stevenson & Associates, Inc. where he worked until 1997. Since 1995, as a close collaborator of Dr. John D. Stevenson, Consulting Engineer, he started to be involved in a number of independent reviews for the Defense Nuclear Facility Safety Board (DNFSB) for seismic SSI analyses of various nuclear defense facilities. During 1996-1997 he was the Principal Investigator of a NSF-funded research project on probabilistic seismic SSI and blast effects for underground hazardous facilities. Over years, he has developed several specialized engineering computer codes for nuclear industry, including the ACS SASSI code that advances significantly the engineering capabilities for performing accurate 3D, nonlinear, incoherent seismic SSI analysis of nuclear facility structures. The ACS SASSI code includes a suite of unique seismic SSI capabilities for the seismic design of the new advanced nuclear reactor facilities. The ACS SASSI code incoherent SSI approach was validated by EPRI (TR# 1013504 Dec 2006 and TR#1015111 Nov 2007) and it currently applied by Westinghouse to the AP1000 seismic design. Dr. Ghiocel is also a contributor to the development of the Bechtel SASSI code, and in early 1990s, he has been the developer of the S&A Super SASSI code.

Over years, Dr. Ghiocel has provided engineering services on seismic SSI analysis, specialized SSI software, or consulting support to many large nuclear corporations including Westinghouse Electric Company - Toshiba Co., Washington Group International, ARES Corporation, Bechtel Engineering, SGH, Sargent &

Lundy, AECL Canada, KOPEC Korea, BINE China, PBMR Ltd. South Africa, Electro-Nuclear Brasil, etc. and also to industry, government and international organizations, including EPRI, NSF, DNFSB, USNRC and IAEA. His past nuclear experience projects included consulting work on structural analysis, seismic SSI analysis, structural design and probabilistic risk assessment for NPP structures, piping systems and equipment. He performed: Probabilistic risk assessment performed for Fort Calhoun NPP Reactor Building; Seismic reevaluation and probabilistic risk assessment for the major site buildings, i.e., Reactor Building, Auxiliary Building, Intake structure and Diesel Generator Building, of Calvert Cliffs NPP; Probabilistic risk assessment studies for different structures of the V. C. Summer NPP, Beaver Valley NPP, Arkansas NPP, including also large diameter flat bottom steel tanks; Independent reviews and reevaluation of the seismic analysis and design of the Fuel Storage Area Rack Reconfiguration and the Canyon Building at the Savannah River facility; Review of seismic soil-structure interaction evaluation including the embedment effects for Pantex, Rocky Flats and Hanford nuclear facilities; Seismic soil-structure interaction evaluations of the Dodewaard Reactor Building founded on piles; Seismic PRA for Dodewaard NPP, including soil liquefaction effects; Determination of fragility curves for the fuel pool, drywell cavity, major equipment for Dodewaard Reactor Building; Evaluation of a fuel shipping cask behavior under an internal hydrogen deflagration; Soil-structure interaction evaluation for buried radioactive waste storage tanks; Structural evaluation and redesign of the Perry NPP Reactor Building internal platform, including the shield doors subjected to severe accident dynamic loads (safety relieve valve, LOCA, pool pressure, etc.) and earthquake motions, and many others.

Aerospace and Automotive Industry Researcher Experience

Over the last decade, he has been Principal Investigator of several large DOD multiyear research projects for new technology developments for the US OSD, US AFRL WPAFB, US Army TARDEC and US Navy NAVAIR for new technology developments in the areas on stochastic modeling for aircraft engines and vehicle system and components, including advanced finite element analysis, stochastic design optimization, component life prediction, low- and high-cycle fatigue modeling for vehicles, fans, risk-based cost-maintenance analysis for aircraft and vehicle systems, reliability of aircraft structural joints under corrosion-fatigue damage and aircraft fault diagnostics and prognostics and structural health management.

For the last ten years, between 1998 and 2008, he played a key technical role in the development of the large, multiyear USAF PRDA project entitled “HCF Blade Probabilistic Design” in which he had the responsibility of Technical Integrator of the industry efforts including as subcontractors GE Aviation and Pratt & Whitney. On these research projects he has been a close collaborator of GE Aviation, United Technologies – Pratt & Whitney, Allison/Rolls-Royce, AFRL Propulsion and Air Vehicle Directorates, NASA Glenn, Boeing – Phantom Works and Lockheed Martin Co.

In the above mentioned DOD new technology research projects, he has applied state-of-the-art and innovative non-deterministic techniques including advanced high-performance reliability approaches, reliability-based optimization algorithms, high-order stochastic field models, stochastic and fuzzy networks, hierarchical stochastic approximation models, combined with advanced stochastic simulation techniques, including Markov Chain Monte Carlo, and hybrid stochastic-neuro-fuzzy system inference for stochastic response approximation, data mining, information fusion and mechanical system health prognostics. During the DOD research projects, Dr. Ghiocel has developed various research collaboration with different top US universities, such as Carnegie Mellon, Cornell University, University of California at Berkeley, Case Western Reserve University, Virginia Tech, Vanderbilt University, University of Colorado at Boulder, John Hopkins University, Princeton University, Toledo University, University of Iowa, University of Wisconsin and Rochester Institute of Technology.

University Researcher Experience

As a basic technical background, Dr. Ghiocel received a Ph.D. in Structural Engineering from Case Western Reserve University, Cleveland, Ohio, in 1993, with a dissertation on Nonlinear Stochastic Dynamics and Structural Reliability with application to Nonlinear Systems subjected to Multiple Random Excitations, and two equivalent M.Sc graduate degrees in *Structural Engineering* (Engineering Diploma) from the Civil

Engineering Technical University of Bucharest, Romania, in 1980, and in *Applied Mathematics* (Post Graduate Certificate) from University of Bucharest, Romania, in 1982. Between 1987-1991 he was an Assistant Professor with University of Bucharest., and, then, after 2001, he became an Adjunct Professor with Case Western Reserve University, Cleveland, Ohio. Over years, Dr. Ghiocel has been university professor and graduate course instructor in Structural Analysis, Structural Dynamics and Seismic Design, Structural Reliability, Strength of Materials and Foundation Engineering. He also advised or co-advised graduate research work and final theses of 8 M.Sc. and 4 Ph.D. students in structural dynamics, seismic SSI and structural reliability engineering in Civil Engineering Technical University of Bucharest, Case Western Reserve University, Virginia Tech, Vanderbilt University and University of Toledo.

Professional Society Activity and Recognition

Dr. Ghiocel has published more than 80 papers in various journals and conference proceedings on structural dynamics, seismic SSI, random vibration, probabilistic modeling and structural reliability issues. He is an active member of several prestigious national technical committees, as AIAA-NDA, SAE-RMSL, ASME-IGTI, ASCE-EMD and ASQ-PNC. He has been for a number of years Vice Chair of AIAA Non-Deterministic Task Group 1999-2003, Chair of SAE Uncertainty and Reliability Quantification Committee, 2001-2004, and more recently nominated Chair of Probabilistic Applications Committee of ASQ.

In 1999 Dr. Ghiocel received the prestigious SAE International "Distinguished Probabilistic Methods Service Award". Since 2001 Dr. Ghiocel has been appointed as Adjunct Professor with Case Western Reserve University, Cleveland, Ohio. Also, since 2001 Dr. Ghiocel has been appointed as Fellow of the North American Academy of Sciences and Arts. He is an Editor-In-Chief for the CRC Press "*Engineering Design Reliability Handbook*" published December 2004, and "*Engineering Design Reliability Applications for the Aerospace, Automotive and Ship Industries*" published in September 2007.