CURRICULUM VITAE

Anthony R. Ingraffea

Dwight C. Baum Professor of Engineering
Weiss Presidential Teaching Fellow
School of Civil and Environmental Engineering
Cornell University
Ithaca, N.Y. 14853 USA

GENERAL

Born: April 4, 1947, Easton, Pennsylvania, USA
Residence: 309 Cayuga Heights Road, Ithaca, N.Y. 14850
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EDUCATION

University of Notre Dame
B.S., Aerospace Engineering, *Magna Cum Laude*, June 1969.
Polytechnic Institute of New York
M.S., Civil Engineering, Grumman Masters Fellow, June 1971.
University of Colorado/Boulder
Ph.D., Civil Engineering, May 1977, University Fellow, 1974-1976.

AREAS OF EXPERTISE

Structural Engineering, Structural Mechanics, Computational and Experimental Fracture Mechanics, Microstructural Simulation of Fatigue and Fracture Mechanisms, Rock Mechanics, Numerical Methods, Engineering Education

PROFESSIONAL EXPERIENCE

June 1969 - June 1971

Grumman Aerospace Corporation. Bethpage, L.I., N.Y.
Rotating traineeship in the following areas: preliminary design on Navy F - 14; loads and dynamic studies, stress analysis, and final design on NASA Space Shuttle proposal. Two in - house technical publications.

July 1971 - June 1973

Peace Corps. Bejuma, Venezuela
County Engineer. Responsible for all technical services to a county of 40,000 people. Directed surveying, design, and construction of farmers' market, tourist hotel, and cemetery. Directed urban planning resource study. Co - directed urban renewal plan and data collection for section of state capital city.

September 1973 - August 1977

University of Colorado/Boulder
Department of Civil, Environmental and Architectural Engineering
Instructor for Courses:
Analytical Mechanics, Theoretical Fluid Mechanics
Teaching Assistant for Courses:
Mechanics of Materials
Materials Testing Laboratory
Research Assistant in Project: Constitutive Relations for Coal

September 1977 - June 1982

Cornell University, Department of Structural Engineering
Assistant Professor

September 1979 - July 1983
Cornell University, Department of Structural Engineering
Manager of Experimental Research

July 1982 - June 1987
Cornell University, Department of Structural Engineering
Associate Professor

August 1983 - August 1984
Lawrence Livermore National Laboratory Livermore, California
Visiting Research Engineer: Rock Fracture Simulation

January 1986 - September, 1986
Cornell University, Computer Aided Design Instructional Facility,
College of Engineering
Director

September 1986 - October, 1990
Cornell University, College of Engineering
Faculty Coordinator for Instructional Computing

July 1987 - Present
Cornell University, School of Civil and Environmental Engineering
Professor

September 1987 - April 1992
Cornell University, Program of Computer Graphics
Associate Director

September 1988 - Present
Fracture Analysis Consultants, Inc.
President

October 1990 - October 1994
Cornell University
Director, **NSF-Synthesis National Engineering Education Coalition**

July 1993 - Present
Cornell University
Dwight C. Baum Professor of Engineering

October 1994 - October 1995
Cornell University
Associate Director, **NSF-Synthesis National Engineering Education Coalition**

December 1997 –August 2005
Cornell Center for Theory and Simulation in Science and Engineering
Associate Director
Coordinator, Computational Materials Institute

July 1998 – December 1999
Cornell University
Coordinator, Infrastructure Group, School of Civil and Environmental Engineering

November 2002-Present
Cornell University
Member, Graduate Fields of Mechanical and Aerospace Engineering

May 2004-Present
Wright Patterson Air Force Base/AFRL/Air Vehicle Directorate/Structures Division
Structural Sciences Center of Excellence
Visiting Scientist

August 2005 – July 2007
Cornell University
Acting Director, Cornell Center for Theory and Simulation in Science and Engineering

November 2005 – Present
Cornell University
Weiss Presidential Fellow

July 2006 – December 2007
Cornell University
Coordinator, Infrastructure Group, School of Civil and Environmental Engineering

August 2005 – Present
Cornell University
Co-Editor in Chief, *Engineering Fracture Mechanics*

August 2010 – Present
Physicians, Scientists, and Engineers for Sustainable and Healthy Energy, Inc.
President

AWARDS AND HONORS

- **3 - M Corporation Scholarship**, 1965 - 1969
- **Grumman Masters Fellowship**, 1969 - 1971
- University of Colorado **Graduate Fellowships**, 1974 - 1976
- Cornell School of Civil Engineering "**Professor of the Year**," 1977 - 78
- National Research Council/U.S. National Committee for Rock Mechanics 1978 **Award for Outstanding Research in Rock Mechanics at the Doctoral Level**
- Cornell College of Engineering "**Professor of the Year**," 1978 - 79
- Cornell School of Civil Engineering "**Professor of the Year**," 1981 - 82
- **Presidential Young Investigator Award**, National Science Foundation, 1984 - 1989
- **Dean's Prize for Innovation in Teaching**, Cornell College of Engineering, 1989.
- **Dean's Prize for Innovation in Teaching**, Cornell College of Engineering, 1991.
- National Research Council/U. S. National Committee for Rock Mechanics **1991 Award for Applied Research** for the paper, "Simulation of Hydraulic Fracture Propagation in Poroelastic Rock with Application to Stress Measurement Techniques", co-authored by Dr. T. J. Boone, *Int. J. Rock Mech. Min. Sci. & Geomech. Abstr*., 28, 1, 1-14, 1991.
- International Association for Computer Methods and Advances in Geomechanics **1994 Significant Paper Award**: One of Five Significant Papers in the category of Computational/Analytical Applications in the past 20 years, "A Numerical Procedure for Simulation of Hydraulically-driven Fracture Propagation in Poroelastic Media", co-authored with T. J. Boone, *Int. J. Num. Analyt. Meth. in Geomech.*, 14, 1, 1990.
- The **NASA Group Achievement Award** for contributions, with former students Drs. Paul Wawrzynek and David Potyondy, to the Fuselage Structural Integrity Analysis Team, NASA Langley Research Center, 1996.
- The First **Society of Women Engineer's Professor of the Year Award**, Cornell College of Engineering, 1997.
- **J. P. and Mary Barger '50 Excellence in Teaching Award**, Cornell College of Engineering, 1997.
- The **MTS Visiting Professor Chair**, Department of Civil Engineering, University of Minnesota, May, 1998.
- **Aviation Safety Turning Goals into Reality Award**, NASA Airframe Structural Integrity Program Team, NASA Langley Research Center, with Dr. Paul Wawrzynek, 1999.
- **1999 Premier Award for Educational Software** for "Cracking Dams-HTTP://www.simscience.org", with Megann Polaha
- **Daniel Luzar '29 Excellence in Teaching Award**, Cornell College of Engineering, 2001.

- **Honor Award, University of Notre Dame,** College of Engineering, for "Significant Contributions to the Advancement of Engineering", 2002.
- **Weiss Presidential Teaching Fellow,** Cornell University, 2005.
- **George R. Irwin Medal**, American Society for Testing and Materials, 2006.
- **Richard J. Almeida Award, Project High Jump,** given each year to an individual whose dedication and contribution to High Jump have been extraordinary, 2008.
- **Fellow, International Congress on Fracture,** 2009, "For his pioneering contributions to the advanced computational simulation of fatigue and fracture processes leading to improved understanding for practical applications to integrity assessment of engineering structures".
- One of **TIME** Magazine's **"People That Mattered"** in 2011.

HONORARY/PROFESSIONAL SOCIETY MEMBERSHIP

Tau Beta Pi (1967 -
Chi Epsilon (1974 -
Sigma Xi (1977 -
American Academy of Mechanics (1988 -
American Society of Civil Engineers (**Fellow, 1991**)
Chairman, Committee on Properties of Materials (1983 - 1985)
Member, Committee on Finite Element Analysis of Reinforced Concrete
Member, Committee on Computer Applications and Numerical Methods
International Society for Boundary Elements
International Society for Rock Mechanics
Society for Experimental Mechanics
American Society for Testing and Materials
Committee E - 8 on Fracture and Fatigue
Committee D - 18 on Soil and Rock for Engineering Purposes
Committee C - 9 on Concrete
American Concrete Institute
Committee 446 on Fracture Mechanics
RILEM
Committee 90 - FMA on Fracture Mechanics Applications
Member, Committee 89 - FMT on Fracture Mechanics Testing
American Rock Mechanics Association/Foundation
Founding Member
Member of the Board, 1999-2003

PROFESSIONAL REGISTRATION

Colorado	PE No. 14837
New York	PE No. 081309-0
Alaska	Professional Fishing Guide

UNITED STATES PATENT

Number 481,826, Hand - held, direct reading, fully mechanical fracture loading device for short-rod/bar specimens

PROFESSIONAL JOURNAL EDITORSHIPS AND ADVISORY BOARDS

Co-Editor-in-Chief:
Engineering Fracture Mechanics, August, 2005-present

Editorial Advisory Board:
International Journal for Numerical and Analytical Methods in Geomechanics
Boundary Element Communications
Engineering with Computers
Engineering Computations
International Journal for Multiscale Computational Engineering

PUBLICATIONS

TEXTS EDITED

1. **Fracture Mechanics of Concrete: Material Characterization and Testing**, co - edited with A. Carpinteri, Martinus Nijhoff Publishers, 1984.

PUBLISHED IN TEXTS

1. Ingraffea, A R (co - author). Modelling of Reinforcement and Representation of Bond. Chapter 3 in **Finite Element Analysis of Reinforced Concrete,** State - of - the - Art report prepared by the Task Committee on Finite Element Analysis of Reinforced Concrete Structures, Structural Division, ASCE, 1982, pp. 149 - 203.

2. Ingraffea A R (co - author). Concrete Cracking. Chapter 4 in **Finite Element Analysis of Reinforced Concrete**. State-of-the-Art report prepared by the Task Committee on Finite Element Analysis of Reinforced Concrete Structures, Structural Division, ASCE, 1982, pp. 204 - 233.

3. Ingraffea A R. Numerical Modelling of Fracture Propagation. Chapter 4 in **Rock Fracture Mechanics**, H. P. Rossmanith, editor, CISM Courses and lectures No. 275, International Center for Mechanical Sciences, Udine, Italy, Springer - Verlag, Wien - New York, 1983, pp. 151 - 208.

4. Ingraffea A R, Saouma V. Numerical Modeling of Discrete Crack Propagation in Reinforced and Plain Concrete. Chapter 4 in **Application of Fracture Mechanics to Concrete Structures: Structural Application and Numerical Calculation,** G. C. Sih and A. DiTommaso, editors, Martinus Nijhoff Publishers, 1984.

5. Ingraffea A R, Gerstle W. Non - Linear Fracture Models for Discrete Crack Propagation. **Application of Fracture Mechanics to Cementitious Composites,** S. P. Shah, editor, Martinus Nijhoff Publishers, 1985, pp. 171 - 209.

6. Ingraffea A R. Fracture Propagation in Rock. Chapter 12 in **Mechanics of Geomaterials,** Z. P. Bazant, editor, John Wiley & Sons, Limited, 1985.

7. Ingraffea A R. Theory of Crack Initiation and Propagation in Rock. Chapter 3 in **Rock Fracture Mechanics**, B. Atkinson, editor, Academic Press, Inc., 1987.

8. Ingraffea A R, Gerstle W H, Perucchio R. Fracture Analysis with Interactive Computer Graphics. **Boundary Element Methods in Structural Analysis**, D. E. Beskos, Editor, ASCE, 1989, pp. 235 - 271.

9. Ingraffea A R, Sections 9.3, 12.3, 13.4, and 15.2, of **Fracture Mechanics of Concrete Structures: From Theory to Applications**, L. Elfgren, Editor, Chapman and Hall, London, 1989.

10. Ingraffea A R, Boone T J, Swenson D V. Computer Simulation of Fracture Processes. Chapter 22 in **Comprehensive Rock Engineering,** J. Hudson, Editor-in-Chief, Pergamon Press, Oxford, 1993.

11. Carter B J, Desroches J, Ingraffea A R, Wawrzynek P A. Simulating Fully 3D Hydraulic Fracturing. In **Modeling in Geomechanics**, Ed. Zaman, Booker, and Gioda, Wiley Publishers, pp 525-557, 2000.

12. Ingraffea A R, Wawrzynek P A. Crack Propagation. In the **Encyclopedia of Materials: Science and Technology**, Elsevier Science, 2001.

13. Ingraffea A R, Wawrzynek P A. Finite Element Methods for Linear Elastic Fracture Mechanics. Chapter 3.1 in **Comprehensive Structural Integrity**, R. de Borst and H. Mang (eds), Elsevier Science Ltd., Oxford, England, 2003.

14. Ingraffea A R. Computational Fracture Mechanics. Volume 2, Chapter 11, **Encyclopedia of Computational Mechanics**, E. Stein, R. de Borst, T. Hughes (eds.) John Wiley and Sons, 2004, 2nd Edition 2008.

15. Emery J, Ingraffea A R. DDSim: Framework for Multiscale Structural Prognosis, Chapter 13 in **Computational Methods for Microstructure-Property Relationships,** S Ghosh and D Dimiduk (eds), Springer Science, 2011.

PUBLISHED IN JOURNALS

1. Ingraffea AR. Nodal Grafting for Crack Propagation Studies. *Int. J. Num. Meth. Eng.*, **11**, 7, 1977, 1185 - 1187.

2. Lynn PP, Ingraffea AR. Transition Element to be Used With Quarter - Point Crack Tip Elements. *Int. J. Num. Meth. Eng.*, **12**, 6, 1978, 1031 - 1036.

3. Ingraffea AR, Heuze FE. Finite Element Models for Rock Fracture Mechanics. *Int. J. Num. Analyt. Meth. Geomech.*, **4**, 1980, 25 - 43.

4. Ingraffea AR, Manu C. Stress - Intensity Factor Computation in Three Dimensions With Quarter - Point Elements. *Int. J. Num. Meth. Eng.*, **15**, 10, 1980, 1427 - 1445.

5. Blandford G, Ingraffea AR, Liggett JA. Two-Dimensional Stress Intensity Factor Calculations Using the Boundary Element Method. *Int. J. Num. Meth. Eng.*, **17**, 1981, 387 - 404.

6. Beech J, Ingraffea, AR. Three - Dimensional Finite Element Stress Intensity Factor Calibration of the Short Rod Specimen. *Int. J. Fracture*, **18**, 3, 1982, 217 - 229.

7. Perucchio R, Ingraffea AR, Abel JF. Interactive Computer Graphic Preprocessing for Three - Dimensional Finite Element Analysis. *Int. J. Num. Meth. Eng.*, **18**, 6, 1982, 909 - 926.

8. Saouma V, Ingraffea AR, Catalano D. Fracture Toughness of Concrete: K_{Ic} Revisited. *J. Eng. Mech. Div.*, ASCE, **108**, No. EM6, 1982, 1152 - 1166.

9. Perucchio R, Ingraffea AR. Interactive Computer Graphics Preprocessing for Three - Dimensional Boundary Integral Element Analysis. *J. Computers Structures*, **16**, 1 - 4, 1983, 153 - 166.

10. Ingraffea AR, Blandford G, Liggett JA. Automatic Modelling of Mixed - Mode Fatigue and Quasi - Static Crack Propagation Using the Boundary Element Method. *ASTM STP **791**: Proc. of the 14th National Symposium on Fracture Mechanics*, June, 1983, I - 407 - I - 426.

11. Ingraffea AR, Gunsallus KL, Beech JF, Nelson PP. A Short - Rod Based System for Fracture Toughness Testing of Rock. *ASTM STP **855**: Chevron - Notched Specimens: Testing and Stress Analysis*, 1984, 152 - 166.

12. Ingraffea AR, Perucchio R, Han T - Y, Gerstle WH, Huang YP. Three - Dimensional Finite and Boundary Element Calibration of the Short - Rod Specimen. *ASTM STP **855**: Chevron-Notched Specimens: Testing and Stress Analysis*, 1984, 49 - 68.

13. Manu C, Ingraffea AR. Numerical Evaluation of the Growth Rate Material Parameters in Fatigue Propagation of Surface Flaws. *Nucl. Eng. Design*, **77**, 2, March, 1984, 131 - 138.

14. Ingraffea AR, Gerstle W, Gergely P, Saouma V. Fracture Mechanics of Bond in Reinforced Concrete. *J. Structural Division*, ASCE, **110**, 4, 1984, 871 - 890.

15. Perucchio R, Ingraffea AR. An Integrated Boundary Element Analysis System with Interactive Computer Graphics for Three Dimensional Linear - Elastic Fracture Mechanics. *J. Comp. Structures*, **20**, 1985, 157 - 171.

16. Nelson PP, Ingraffea AR, O'Rourke TD. TBM Performance Prediction with Rock Fracture Parameters. *Int. J. Rock Mech. Mining Sciences*, **22**, 3, June, 1985, 189 - 192.

17. Elices M, Llorca J, Ingraffea AR. Fractura del Hormigon en Regimen Elastico y Lineal. Un Ejemplo: La Presa de Fontana (in Spanish), *Informes de la Construccion.* **37**, 372, July, 1985, 19 - 33.
18. Ingraffea AR, Gerstle WH, Mettam K, Wawrzynek P, Hellier AK. Cracking of Welded Crane Runway Girders: Physical Testing and Computer Simulation. *Iron and Steel Engineer*, **62**, 12, 1985, 46 - 52.
19. Boone TJ, Wawrzynek P, Ingraffea AR. Simulation of the Fracture Process in Rock with Application to Hydro-fracturing. *Int. J. Rock Mech. Mining Sciences*, **23**, 3, 1986, 255 - 265.
20. Abel JF, Ingraffea AR, McGuire W, Greenberg DP. Interactive Color Graphical Postprocessing as a Unifying Influence in Numerical Analysis Research. *Finite Elements in Analysis and Design*, **2**, 1986, 1 - 17.
21. Boone TJ, Wawrzynek P, Ingraffea, AR. Finite Element Modeling of Fracture Propagation in Orthotropic Materials. *Eng. Fract. Mech.*, **26**, 2, 1987, 185 - 201.
22. Gerstle WH, Martha L, Ingraffea AR. Finite and Boundary Element Modeling of Crack Propagation in Two - and Three – Dimensions. *Eng. with Computers*. **2**, 1987, 167 - 183.
23. Hellier AK, Sansalone M, Ingraffea AR, Carino NJ, Stone, C. Finite Element Analysis of the Pullout Test Using a Nonlinear Discrete Cracking Approach. *Cement, Concrete and Aggregates*, **9**, 1, Summer 1987, 20 - 29.
24. Wawrzynek P, Ingraffea AR. Interactive Finite Element Analysis of Fracture Processes: An Integrated Approach. *Theor. Appld. Fract. Mech*. **8**, 1987, 137 - 150.
25. Wawrzynek P, Ingraffea AR. An Edge - Based Data Structure for Two-Dimensional Finite Element Analysis. *Eng. with Computers*, **3**, 1987, 13 - 20.
26. Llorca J, Elices M, Ingraffea AR. Analisis Lineal Y No Lineal De Propagacion De Fisuras En Hormigon," (In Spanish), *Revista Internacional de Metodos Numericos para Calculo y Diseno en Ingenieria*, **3**, 3, 1987, 309 - 333.
27. Swenson DV, Ingraffea AR. Using Combined Experiments and Analysis to Generate Dynamic Critical Stress Intensity Data. *ASTM STP **969**: Fracture Mechanics: 19th Symposium*, T. A. Cruse, Ed., American Society for Testing and Materials, Phila., 1988, 405 - 426.
28. Gerstle WH, Ingraffea AR, Perucchio R. Three-Dimensional Fatigue Crack Propagation Analysis Using the Boundary Element Method. *Int.J. Fatigue*, **10**, 3, 1988, 187 - 192.
29. Swenson DV, Ingraffea AR. Modelling Mixed-Mode Dynamic Crack Propagation Using Finite Elements: Theory and Applications. *Computational Mech.*, **3**, 1988, 187-192.
30. Linsbauer HN, Ingraffea AR, Rossmanith H P, Wawrzynek PA. Simulation of Cracking in a Large Arch Dam: Part I. *J. Structural Eng.*, **115**, 7, July 1989, 1599 - 1615.
31. Linsbauer HN, Ingraffea AR, Rossmanith HP, Wawrzynek PA. Simulation of Cracking in a Large Arch Dam: Part II. *J. Structural Eng.*, **115**, 7, July, 1989, 1616 - 1630.
32. Ingraffea AR. Case Studies of Simulation of Fracture in Concrete Dams. *Eng. Fracture Mech.*, **35**, 1/2/3, 1990, 553-564.
33. Vossoughi H, Soudki K, White RN, Ingraffea AR, Sansalone M. Fatigue of Thick Steel Plates Bent to a Low R/t Ratio. *J. Pressure Vessel Tech.*, **111**, August 1989, 259 - 265.
34. Boone TJ, Ingraffea AR. A Numerical Procedure for Simulation of Hydraulically - Driven Fracture Propagation in Poroelastic Media. *Int. J. Num. Analyt. Meth. Geomech.*, **14**, 1990, 27-47.
35. Grigoriu M, Saif M, El Borgi S, Ingraffea AR. Mixed - Mode Fracture Initiation and Trajectory Prediction Under Random Stresses. *Int. J. Fracture*, **45**, 1990, 19-34.

36. Boone TJ, Ingraffea AR, Roegiers J - C. Visualization of Hydraulically - Driven Fracture Propagation in Poroelastic Media Using a Super – Workstation. *J. Petroleum Tech*, June 1989, 574 - 580.

37. Wawrzynek PA, Ingraffea AR. An Interactive Approach to Local Remeshing Around a Propagating Crack. *Finite Elem. in Analys. and Design*, **5**, 1989, 87 - 96.

38. Ingraffea AR, Barry A. Analytical Study of Transmission, Distribution Lines under Railroads. *Pipe Line Industry*, October 1989, 34 - 39.

39. Gray LJ, Martha LF, Ingraffea AR. Hypersingular Integrals in Boundary Element Fracture Analysis. *Int. J. Num. Meth. Eng.*, **29**, 1990, 1135-1158.

40. Mann KA, Bartel DL, Wright TM, Ingraffea AR. Mechanical Characteristics of the Stem-Cement Interface. *J. Ortho. Research*, **9**, 798-808, 1991.

41. Heuze F, Shaffer RJ, Ingraffea AR, Nilson RH. Propagation of Fluid-driven fractures in Jointed Rock. Part 1 - Development and Validation of Methods of Analysis. *Int. J. Rock Mech. Mining Sci. & Geomech. Abstr.*, **27**, 4, 243 - 254, 1990.

42. Swenson DV, Ingraffea AR. The Collapse of the Schoharie Creek Bridge: A Case Study in Concrete Fracture Mechanics. *Int. J. Fracture*, **51**, 73-92, 1991.

43. Gerstle WH, Ingraffea AR. Does Bond-Slip Exist? *Concrete International*, **13**, 1, 44-48, 1991.

44. Gerstle WH, Ingraffea AR. Compliance and Stress-Intensity Factor Calibration of the CENRBB Specimen. *Int. J. Rock Mech. Mining Sci. & Geomech. Abstr.*, **28**, 1, 85-92, 1991.

45. Bittencourt TN, Barry A, Ingraffea AR. Comparison of Mixed-Mode Stress Intensity Factors Obtained Through Displacement Correlation, J-Integral Formulation, and Modified Crack-Closure Integral. *ASTM STP 1131: Fracture Mechanics: Twenty Second Symposium (Vol. II)*, Philadelphia, 69-82, 1992.

46. Boone TJ, Ingraffea AR, Roegiers JC. Simulation of Hydraulic Fracture Propagation in Poroelastic Rock with Application to Stress Measurement Techniques. *Int. J. Rock Mech. Min. Sci. & Geomech. Abstr.*, **28**, 1, 1-14, 1991.

47. Mukherjee Y X, Xie Z, Ingraffea AR. Delamination Buckling of Laminated Plates. *Int. J. Num. Meth. Eng.*, **32**, 1321-1337, 1991.

48. Martha LF, Llorca J, Ingraffea AR, Elices M. Numerical Simulation of Crack Initiation and Propagation in an Arch Dam. *Dam Engineering*, **2**, 3, 193-214, 1991.

49. Martha LF, Gray, L J, Ingraffea AR. Three-Dimensional Fracture Simulation with a Single-Domain, Direct Boundary Element Formulation. *Int. J. Num. Meth. Eng.*, **35**, 1992.

50. Gaisbauer H, Rossmanith H-P, Ingraffea AR. Der Einfluß von Talforn und Schwächezonen im wassersetigen Aufstandsbereich aud das Tragverhaltern einer Gewölbesperre. (In German) *Osterreichische Ingenieur- und Architekten-Zeitschrift*, **137**, 9, 427-434, 1992.

51. Lutz E, Ingraffea AR, Gray L. Use of 'Simple Solutions' for Boundary Integral Methods in Elasticity and Fracture Analysis. *Int. J. Num. Meth. Eng.*, **35**, 1737-1751, 1992.

52. Soudki KA, Sansalone M, Ingraffea AR, Vossoughi H. Numerical Simulation of the Severe Cold Bending of Thick Steel Plates. ASME, *J. Pressure Vessel Tech.*, **114**, 1992.

53. Martha L, Wawrzynek P, Ingraffea AR. Arbitrary Crack Propagation Using Solid Modeling. *Engrg. with Computers*, **9**, 2, 63-82, 1993.

54. Sousa J, Carter B, Ingraffea AR. Numerical Simulation of 3D Hydraulic Fracture Using Newtonian and Power-Law Fluids. *Int. J. Rock Mech. Min. Sci. & Geomech. Abstr*., **30**, 7, 1265-1271, 1993.

55. Elbert K, Wright T, Rimnac C, Klein R, Ingraffea AR, Gunsallus K, Bartel D. Fatigue Crack Propagation Behavior of Ultra High Molecular Weight Polyethelene under Mixed Mode Conditions", *J. Biomedical Materials Research, **28***, 181-187, 1994.

56. Gray L, Potyondy D, Lutz E, Wawrzynek P, Martha L, Ingraffea AR. Crack Propagation Modeling. *Math. Models Meth. Applied Sci.,* **4**, 2, 179-202, 1994.

57. Potyondy D, Wawrzynek P, Ingraffea AR. Discrete Crack Growth Analysis Methodology for Through Cracks in Pressurized Fuselage Structures. *Int. J. Num. Methods Eng*., **38**, 1611-1633, 1995.

58. Potyondy D, Wawrzynek P, Ingraffea AR. An Algorithm to Generate Quadrilateral or Triangular Element Surface Meshes in Arbitrary Domains with Applications to Crack Propagation. *Int. J. Num. Methods Eng.,* **38**, 2677-2701, 1995.

59. Bittencourt T, Wawrzynek P, Sousa J, Ingraffea, AR. Quasi-Automatic Simulation of Crack Propagation for 2D LEFM Problems. *Eng. Fract. Mech.,* **55**, 2, 321-334, 1996.

60. Bittencourt T, Ingraffea AR. Three-Dimensional Cohesive Crack Analysis of Short-Rod Specimens. *ASTM-STP **1220**: Fracture Mechanics: 25th Volume*, 46-60, 1995.

61. Bittencourt T, Ingraffea AR. Um Metodo Numericao para o Modelmento de Fraturamento Coesivo em 3D (In Portugese). *Revista Internacional de Metodos Numericos para Calculo y Diseno en Ingeneria*, **11**, 4, 1-10, 1995.

62. Zehnder A, Ingraffea AR. Reinforcing Effects of Coverlayers on the Fatigue Life of Copper-Kapton Flex Cables. *IEEE Trans. Comp. Pack. Manuf. Tech.,* **18**:704-710, 1995.

63. Shah KR, Carter BJ, Ingraffea AR. Hydraulic Fracturing Simulation in Parallel Computing Environment. *Int. J. Rock Mech. & Min. Sci.,* 34, 3-4, Paper 282, 1997.

64. Chen C-S, Wawrzynek PA, Ingraffea AR. Methodology for Fatigue Crack Growth and Residual Strength Prediction with Applications to Aircraft Fuselages. *Computational Mechanics*, **19**:527-532, 1997.

65. Hanson JH, Ingraffea AR. Standards for Fracture Toughness Testing of Rock and Manufactured Ceramics: What Can We Learn for Concrete? *Cement, Concrete and Aggregates*, **19**:79-87, 1997.

66. Riddell WT, Ingraffea AR, Warwrzynek PA. Experimental Observations and Numerical Predictions of Three-Dimensional Fatigue Crack Propagation. *Eng. Fract. Mech.,* **58**: 293-310, 1997.

67. Singh R, Carter B, Wawrzynek P, Ingraffea AR. Universal Crack Closure Integral for SIF Estimation. *Eng. Fract. Mech.,* **60**:133-146, 1998.

68. Hwang CG, Wawrzynek P, Tayebi AK, Ingraffea AR. On the Virtual Crack Extension Method for Calculation of the Rates of Energy Release Rate. *Eng. Fract. Mech.,* **59**:521-542, 1998.

69. Chen C-S, Wawrzynek, PA, Ingraffea AR. Elastic-Plastic Crack Growth Simulation and Residual Strength Prediction of Thin Plates with Single and Multiple Cracks. *Fatigue and Fracture Mechanics: 29th Volume, ASTM STP 1332*, 97-113, 1998.

70. Carter BJ, Wawrzynek, PA, Ingraffea AR. Automated 3D Crack Growth Simulation. Gallagher Special Issue of *Int. J. Num. Methods Eng.*, **47**:229-253, 2000.

71. Chi W-M, Deierlein G, Ingraffea AR. Finite Element Fracture Analysis of Welded Beam-Column Connections. *Fatigue and Fracture Mechanics: 30th Volume, ASTM STP **1360***, 439-455, 2000.

72. Castell M, Ingraffea AR, Irwin L. Fatigue Crack Growth in Pavements. **126:**283-290, *ASCE J. Transportation Eng.*, 2000.

73. TerMaath SC, Ingraffea AR, Wawrzynek PA. A Computational Fracture Mechanics Approach for the Analysis of Facesheet-from-Core Disbond of Honeycomb Core Sandwich Panels. *Fatigue and Fracture Mechanics: 30th Volume, STP 1360*, P.C. Paris and K.L. Jerina, Eds., American Society for Testing and Materials, West Conshohocken, PA, 169-182, 1999.

74. Chen C-S, Krause R, Pettit RG, Banks-Sills L, Ingraffea A R. Numerical Assessment of T-stress Computation Using a P-version Finite Element Method. *Int. J. Fract.*, **107:**177-199, 2001.

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FUNDED RESEARCH PROJECTS

Structural Engineering

1. "An Investigation into Mixed - Mode Fracture Propagation in Rock," National Science Foundation Research Initiation Grant ENG78 - 05402, 4/78 - 3/80, $25,000, Principal Investigator.

2. "Finite Element Analysis of Reinforced Concrete for Cyclic Loading," National Science Foundation Grant PFR - 7900711, 4/79-3/81, $84,000, Principal Investigator. P. Gergely and R. N. White, Co - Principal Investigators.

3. "Laboratory Testing of the Crack - at - an - Interface Problem," Sandia National Laboratories Contract No. 13 - 5038, 5/79 - 5/80, $42,000, Principal Investigator.

4. "Three - Dimensional Interactive Computer Graphics in Structural and Geo - Mechanics," National Science Foundation Grant CME79 - 16818, 1/80 - 6/82, $500,000, Faculty Investigator. J. F. Abel, D. P. Greenberg, W. McGuire, Co-Principal Investigators; F. H. Kulhawy, Faculty Investigator.

5. "Interaction Between Steel and Concrete for Earthquake-Type Loadings," National Science Foundation Grant CME80 - 20925, 4/1/81 - 9/30/83, $140,000, Principal Investigator. P. Gergely, Co - Principal Investigator.

6. "Interactive Color Display of Three - Dimensional Engineering Analysis Results," National Aeronautics and Space Administration, Grant NAG3 - 395, 3/1/83 - 2/28/87, $133,285, Associate Investigator. J. F. Abel, Principal Investigator.

7. "Welded Crane Runway Girder Study," Association of Iron and Steel Engineers, 8/83 - 8/85, $234,348, Principal Investigator. W. McGuire, T. Pekoz, Co - Principal Investigators.

8. Presidential Young Investigator Award in Structural Mechanics, National Science Foundation Grant 8351914, 6/84 - 6/89, $500,000, Principal Investigator.

9. "Fatigue Behavior of Thick Steel Plates," Electric Boat Division/General Dynamics, PO# R2041 - 907, 1/86 - 12/88, $233,218, Co - Principal Investigator. R. N. White, Principal Investigator.

10. "Probabilistic Fracture Mechanics," AFOSR, 4/87 - 4/90, $269,624, Co - Principal Investigator. M. Grigoriu, Co - Principal Investigator.

11. "CISE Research Instrumentation: Computer Graphics Dynamic Simulation for Scientific Inquiry," National Science Foundation Grant CCR - 8717024, 4/1/88 - 9/30/89, $145,600, Co - Principal Investigator. M. Cohen, D. Greenberg, and J. Abel, Co - Principal Investigators.

12. "Visualization for Supercomputing: A Graphics Workstation Approach," National Science Foundation, Grant ASC - 8715478, 8/1/88 - 1/31/90, $202,532, Co - Principal Investigator. D. Greenberg, Principal Investigator. J. Abel, M. Cohen, D. Caughey, Co - Principal Investigators.

13. "Advanced Computational Fracture Mechanics," Digital Equipment Corporation, 7/89 - 7/90, $100,000, Principal Investigator.

14. “Fatigue and Damage Tolerance”, Northrop-Grumman Corporation, 6/89-12/00, $249,000, Principal Investigator.

15. "Research in Fracture Mechanics", Exxon Education Foundation, 9/89-9/92, $30,000, Principal Investigator.

16. "Crack Growth Prediction Methodology for Multi-Site Damage", NASA Langley Research Center, 9/90-9/98, $926,147, Principal Investigator.

17. “Fracture Mechanics Life Analytical Methods Verification Testing", Nichols Research Corp. /NASA MSFC, 8/91 - 8/94, $183,860, Principal Investigator.

18. "Mode I/III Fatigue Crack Growth Measurements in 2024 Aluminum Sheet", NASA Langley Research Center, 6/91-9/93, $159,836, Co-Principal Investigator. A. Zehnder, Co-Principal Investigator.

19. “A Study of Failure Mechanisms of Advanced Flex Cables”, IBM Corporation, 1/20/92-1/19/93, $25,000, Co-Principal Investigator. A. Zehnder, Co-Principal Investigator.

20. “Detecting Cracks in Concrete Dams”, U. S. Army Engineer Waterways Experiment Station, 4/1/94-1/1/95, $39,339, Co-Principal Investigator. M. Sansalone, Principal Investigator.

21. “Measurement of Fracture Toughness of Concrete Using the Short-Rod Procedure”, NSF CMS 9414243, 9/95-8/98, $203,854. Principal Investigator.

22. "Simulation of Damage Tolerance in Honeycomb Core Structure", Boeing Commercial Airplane Co., 5/96-12/98, $204,000. Principal Investigator.

23. "Simulation of Crack Growth in Spiral Bevel Gears", NASA Glenn Research Center, 12/96-12/00, $289,961. Principal Investigator.

24. "Fracture of Steel Joints", CUREe SAC Phase II Subcontract No. 28, 9/96-12/96, $23,000. Co-Principal Investigator. Prof. G. Deierlein, Principal Investigator.

25. “Multidisciplinary Center for Earthquake Engineering Research”, NSF, 10/97-9/02, $1,500,000. Associate Investigator. Prof. R. White, Co-Principal Investigator; Profs. G. Deierlein, M, Grigoriu, Associate Investigators.

26. “Simulation of Crack Propagation on Teraflop Computers”, NSF, 1/98-12/00, $1,800,000. Co-Principal Investigator. Profs. S. Vavasis and K. Pingali, Co-Principal Investigators.

27. “Probabilistic Simulation of Fatigue Crack Initiation”, AFOSR, 3/98-2/01, $600,000. Principal Investigator. Profs. M. Grigoriu, M. Miller, P. Dawson, Co-Principal Investigators.

28. “Development and Implementation of T-Stress Criterion”, NASA Langley Research Center, 8/97-3/98, $20,128. Principal Investigator.

29. “Crack Turning and Arrest Mechanisms for Integral Structures”, NASA Langley Research Center, 1/98-6/00, $103,642. Principal Investigator.

30. “Basic Research in Crack Growth Prediction Methodologies”, NASA Langley Research Center, 1/98-11/99, $185,000. Principal Investigator.

31. “Fatigue Crack Growth in Aluminum Alloys”, Alcoa Foundation, 6/97-5/98, $10,000. Principal Investigator.

32. “Multiscale Modeling of Defects in Solids”, NSF 9873214, 10/98-9/01, $1,500,000. Co-Principal Investigator. Profs. P. Dawson, and J. Sethna Co-Principal Investigators, C. Myers, Co-Principal Investigator.

33. “A Two-Tier Computation and Visualization Facility for Multiscale Problems”, NSF 9972853, 10/99-9/04, $1,500,000. Co-Principal Investigator. Profs. K. Pingali, N. Chrisochoides, C. Cruz-Neira, Guang Gao, Co-Principal Investigators.

34. “Finite Element Stress Analysis Subroutines for RAPID”, Federal Aviation Administration, 9/99-4/2000, $34,438. Principal Investigator.

35. “Finite Element/Fracture Mechanics Simulation of Trajectories During Slitting of Plastic Films”, Eastman Kodak Company, 1/1/99-12/31/01, $110,000. Principal Investigator.

36. “ITR: Adaptive Software for Field-driven Simulations”, NSF 0085969, 9/1/00-8/31/04, $5,000,000. Co-Principal Investigator. Prof. K. Pingali, PI, B. K. Soni, J. F. Thompson S. A. Vavasis, Co-PIs.

37. “Developing Technologies for Modeling Damage in Stiffened Thin Shell Structures”, NASA LaRC, 11/1/01-10/31/04, $160,107. Principal Investigator.

38. “Computational Micro-Mechanical Investigations of Crack Initiation in Metallic Polycrystals”, NASA LaRC, 2/1/02-1/31/05, $230,182. Principal Investigator.

39. “The Institute for Future Space Transport”, NASA Marshall RC University Research, Engineering and Technology Institute, 8/1/02-9/15/07, $15,616,120, Co-Principal Investigator. W. Shyy, Principal Investigator, B. Soni, B. Davidson, J. Olds, Co-Principal Investigators.

40. “Structural Integrity Prognosis System-SIPS”, DARPA, 10/1/03-8/31/08, $1,288,400, Cornell Principal Investigator. J. Madsen, Northrop Grumman Corp. Project Manager.

41. "Fracture Mechanics Analysis of MANPADS-Damaged Aircraft Structures", NASA LaRC, 5/05-9/06, $74,000. Principal Investigator.

42. “Advanced Digital Material Machine (ADMM) “AFOSR/DURIP, 2006, $300,000. Principal Investigator.

43. “Multi-Scale Simulation of Cracking Processes in Metallic Materials“, NASA LaRC, NNX07AB69A, 1/07-12/10, $392,526. Principal Investigator.

44. “Constellation University Institute Project: Computational Simulation of Damage Tolerance for Composite and Metallic Structures”, NASA, 10/1/07-9/30/10, $450,000, Principal Investigator.

45. “Multi-scale Simulation of Fatigue Damage”, Northrop Grumman Corporation, 1/1/07-12/31/09, $55,000, Principal Investigator.

46. “Computational Methods in Physics-Based Modeling of Damaged Flight Structures”, NASA LaRC NNX08AC50A, 1/1/08-12/31/2010, $299,972, Principal Investigator.

47. “Collaboration between Cornell Fracture Group and Exponent, Inc.”, Exponent Inc., 3/08-12/08, $29,204, Principal Investigator.

48. “Geometrical Simulation of Complete Process of Microstructurally Small Fatigue Cracking” E DARPA, HR0011-09-1-0002, 1/09-12/09, $150,000, Principal Investigator.

49. “Parallel File Serving R&D”, IBM, $20,200, 7/09-6/10, Principal Investigator.

50. “Prognosis of Long-Term Load-Bearing Capability in Aerospace Structures: Quantification of Microstructurally Short Crack Growth“, Air Force Office of Scientific Research, $750,000, 5/10/5/13, Co-Principal Investigator.

Geotechnical Engineering

1. "TBM Performance Study," U.S. Dept. of Transportation, 3/80 - 3/82, $164,000, Associate Investigator. T. D. O'Rourke, Principal Investigator; F. H. Kulhawy, Associate Investigator.

2. "A Study of Cast Iron Gas Main Replacement," New York Gas Group, 8/81 - 12/83, $287,000, Associate Investigator. T. D. O'Rourke, Principal Investigator; F. H. Kulhawy, Associate Investigator.

3. "Uplift/Compression Transmission Line Structure Foundation Research," Electric Power Research Institute, RP1493 - 4, 1984 - 1988, $2,450,000, Associate Investigator. F. H. Kulhawy, Principal Investigator; T. D. O'Rourke, M. Grigoriu, Associate Investigators.

4. "Numerical Investigations into Crack Propagation in Rock," National Science Foundation Grant CEE - 8316730, 6/1/84 - 5/30/86, $150,000. Principal Investigator

5. "Workshop on Interactive Computer Modeling and Graphics for the Design and Optimization of Field and Laboratory Experiments in Geotechnical Engineering." National Science Foundation Grant CEE 8413471, 12/84 - 11/86, $39,681. Principal Investigator.

6. "Evaluation of Cased and Uncased Gas Distribution and Transmission Piping Under Railroads and Highways, Gas Research Institute, 11/86 - 1/94, $ 3,602,035. Co-Principal Investigator. T. D. O'Rourke and H. Stewart, Co-Principal Investigators.

7. "Influence of Perforations Upon Subsequent Hydraulic Fracturing," Digital Equipment Corp. and Dowell Schlumberger, 1/88 - 12/96, $448,000. Principal Investigator.

8. “Computational Simulation of Hydrofracturing”, NSF CISE Postdoctoral Associate Award for Dr. K. Shah. 11/95-10/97, $46,200. Principal Investigator.

9. "3D Crack Initiation and Propagation in Transparent Rock Like Materials Loaded in Compression", NSF, 9/96-8/99, $148,000. Principal Investigator.

Engineering Education

1. "Study of Complementary Research and Teaching in Engineering Science - PROJECT SOCRATES," U. S. Department of Education, Fund for the Improvement of Post - Secondary Education, G 008642170, 9/15/86 - 9/14/89, $236,496, Project Director.

2. "Workstations For Instructional Computing in the College of Engineering," Digital Equipment Corporation, 5/1/88 - 4/31/90, $664,000. Project Director.

3. "Workstations for Project SOCRATES," Apollo Computer, Inc., June, 1989, $87,105. Project Director.

4. "Workstations for Project SOCRATES", Sun Microsystems, Inc., June, 1990, $89,415. Project Director.

5. "Synthesis National Engineering Education Coalition", National Science Foundation, 9/30/90 - 9/30/94, $12,278,036. Project Director.

6. "1992 Summer Institute for Computer Graphics", New York State Education Department, $56,000, 7/19/92-8/8/92, Project Co-Director. C. Mink, Director.

7. "Support for Educational Computing Equipment", Hewlett Packard, 6/92, $427,318. Project Director.

8. "Synthesis Coalition/GE Foundation Faculty Exchange Award", GE Foundation, Spring 1994 - Spring 1997, $230,000, Principal Investigator.

9. "Synthesis Coalition/Raytheon Company Student Award" Raytheon Company, 1994-1995, $24,000, Principal Investigator.

10. "Application and Infrastructure Linkage to Altoona Area School District and Manhatten Center for Science and Math High School", Synthesis Coalition/NSF/GE Foundation/Mr. A. Misciagna, 10/1/94-9/30/96, $284,000, Project Director.

11. "Integration of Information Age Networking and Parallel Supercomputer Simulations into University and General Science K-12 Curricula", NSF, 1/96-12/98, $102,000, Co-Principal Investigator. J. Sethna, Co-Principal Investigator.

12. REU Supplement to "Measurement of Fracture Toughness of Concrete Using the Short-Rod Procedure", NSF, 9/95-9/98, $10,000, Principal Investigator.

13. REU Supplements to "Integration of Information Age Networking and Parallel Supercomputer Simulations into University and General Science K-12 Curricula", NSF, 9/96-9/98, $20,000, Co-Principal Investigator with Prof. James Sethna, Physics.

14. “Tech City Exhibition”, NSF, 7/98-6/01, $639,543, Co-Principal Investigator. Dr. C. Trautmann, Principal Investigator.

15. “An Advanced Interactive Discovery Environment for Engineering Education” NASA/New York State/AT&T, 2/1/01-12/31/07, $4,300,000, Co-Principal Investigator. Prof. B. Davidson, Principal Investigator, Prof. E. Liddy, Co-PI.

16. "An IGERT Training Program In Sustainable Energy Recovery From The Earth-Education At The Intersection Of Geosciences And Engineering". July 2010-June 2015, National Science Foundation, $1,137,047. Co-Principal Investigator. Prof. Jeff Tester, Principal Investigator, Profs. Terry Jordan, Paulette Clancy, Co-PI’s.

Co-operative Research

1. "Co-operative Agreement between Cornell University and the Technical University of Delft", National Science Foundation Grant PFR-8020924, 1/81 - 12/82, $25,800, Co - Principal Investigator. P. Gergely, Principal Investigator; R. N. White, Co – Principal Investigator.

2. "Scientific Visit to Plan Co-operative Research in Hydraulic Fracturing," Catholic University of Rio de Janiero/Cornell University, National Science Foundation Grant INT - 8814466, July 1988, $2,336, Principal Investigator.

3. "Fracture Mechanics Case Studies of Concrete Dams" Technical University of Vienna, Austria/Cornell University, National Science Foundation Grant INT-8814457, 2/89 - 2/92, $8,080, Principal Investigator.

4. International Supplement to National Science Foundation Grant “ITR: Adaptive Software for Field-driven Simulations”, to collaborate with Czech Technical University, Z. Bittnar, Czech Co-PI, 7/99-8/03, $24,375, Co-Principal Investigator.

THESES DIRECTED

Master of Science

1. "A Fracture Mechanics Analysis of the Fontana Dam," John Chappell, May, 1981.

2. "Mixed-Mode Crack Propagation in Mortar and Concrete." Manrique Arrea, January 1982.

3. "The Fracture Mechanics of Bond in Reinforced Concrete," Walter Gerstle. May 1982.

4. "Concrete Fracture: A Linear Elastic Fracture Mechanics Approach," David Catalano, August, 1982.

5. "Interactive and Graphic Two - Dimensional Fatigue Crack Propagation Analysis Using Boundary Element Method," Kodwo Otsei;du, January, 1983.

6. "An Experimental Investigation of Fatigue Cracking in Welded Crane Runway Girders Due to Wheel Induced Stresses," Kirk I. Mettam, January, 1986.

7. "An Investigation of the Failure Process of the STEM - PMMA Interface in Cemented Prostheses," Leonard Daniel - Timmie Topoleski, June 1986.

8. "Interactive Finite Element Analysis of Fracture Processes: An Integrated Approach," Paul A. Wawrzynek, May 1987.

9. "Analytical Study of Stresses in Transmission and Distribution Pipelines Beneath Railroads," J. Russell Blewitt, May 1987.

10. "Case Studies of Cracking of Concrete Dams--A Linear Elastic Approach," Shan - Wern Steve Lin, January 1988.

11. "Fracture Analysis Code: A Computer - Aided Teaching Tool," Maya Srinivasan, January 1988.

12. "Two-Dimensional Numerical Evaluation of Near Wellbore Phenomena: Perforation Performance & Interacting Hydraulic Fractures", Stephen James Lamkin, May 1990.

13. “On Finite Element Analysis of Face Sheet Cracking in Honeycomb Core Sandwich Panels”, Kenneth Ferguson, January 1999.

14. “Simulating Fatigue Crack Growth in Spiral Bevel Gears”, Lisa Eron Spievak, August 1999.

15. “Cracking Dams: An Interactive Web Site for K12”, Megann V. Polaha, August 1999.

16. "Experimental Investigations into Damage Tolerance of Honeycomb Sandwich Panels", Ani Ural, August, 1999.

17. “Simulations of Crack Initiation in Aluminum Alloys with Inclusions“, Ketan Dodhia, January, 2002.

18. “Decohesion of Grain Boundaries in Statistical Representations of Aluminum Polycrystals“, Erin Iesulauro, January, 2002.

19. “An Evaluation of Surface Cracks in Welded Components of Nuclear Reactor Vessels”, John Emery, May, 2003.

20. “Microstructural Reconstruction and Three-Dimensional Mesh Generation for Polycrystalline 7075-T651 Aluminum Alloy“, Michael Veilleux, May, 2007.

21. “A Two-Dimensional Multiscale Method for Fatigue Crack Nucleation in Polycrystalline Aluminum Alloys “, Jeffrey Bozek, May, 2007.

Doctor of Philosophy

1. "Three-Dimensional Finite Element Analysis of Cyclic Fatigue Crack Growth of Multiple Surface Flaws." Corneliu Manu, June, 1980. Professor (Retired) University of Toronto.

2. "Automatic Two-Dimensional Quasi-Static and Fatigue Crack Propagation Using the Boundary Element Method." George E. Blandford, January, 1981. Professor, University of Kentucky.

3. "Interactive Finite Element Analysis of Reinforced Concrete: A Fracture Mechanics Approach," Victor E. Saouma, January, 1981. Professor, University of Colorado/Boulder.

4. "An Integrated Boundary Element Analysis System with Interactive Computer Graphics for Three - Dimensional Linear Elastic Fracture Mechanics," Renato S. Perucchio, January, 1984. Professor, University of Rochester.

5. "Finite and Boundary Element Modelling of Crack Propagation in Two- and Three - Dimensions Using Interactive Computer Graphics," Walter H. Gerstle, January, 1986. Professor, University of New Mexico.

6. "Modeling Mixed - Mode Dynamic Crack Propagation Using Finite Elements," Daniel V. Swenson, January 1986. Professor, Kansas State University.

7. "Simulation of Crack Propagation in Poroelastic Rock with Application to Hydrofracturing and *In - Situ* Stress Measurement," Thomas J. Boone, January, 1989. VP of Research, EXXON.

8. "Topological and Geometrical Modeling Approach to Numerical Discretization and Arbitrary Fracture Simulation in Three-Dimensions," Luiz Martha, August, 1989. Professor, Catholic University of Rio de Janeiro, Brazil.

9. "Numerical Methods for Hypersingular and Near-Singular Boundary Integrals in Fracture Mechanics", Earlin Lutz, May, 1991. Senior Research Engineer, Bentley, Inc.

10. "Discrete Modelling of Crack Propagation: Theoretical Aspects and Implementation Issues in Two and Three Dimensions", Paul A. Wawrzynek, August, 1991. Chief Engineer, Fracture Analysis Consultants, Inc.

11. "Three-Dimensional Simulation of Near-Wellbore Phenomena Related to Hydraulic Fracturing from a Perforated Wellbore", José Sousa, May, 1992. Professor, University of Campinas, Brazil.

12. "Computer Simulation of Linear and Nonlinear Crack Propagation in Cementitious Materials", Tulio Bittencourt, May, 1993. Professor, University of Sao Paulo, Brazil.

13. "A Methodology for Simulation of Curvilinear Crack Growth in Pressurized Shells", David Potyondy, August, 1993. Senior Research Engineer, Itasca, Inc.

14. "Experimental Validation Testing of Numerical Prediction Techniques for Three-Dimensional Fracture and Fatigue", William Riddell, June, 1995. Assoc. Professor, Rowan University.

15. “Crack Growth Simulation and Residual Strength Prediction in Thin Shell Structures”, Chuin-Shan Chen, January, 1999. Assoc. Prof., National Taiwan University.

16. “Virtual Crack Extension Method for Calculating Rates of Energy Release Rate and Numerical Simulation of Crack Growth in Two and Three Dimensions”, Changyu Hwang, January, 1999. Professor, Seoul University of Venture and Information.

17. “Crack Turning in Integrally Stiffened Aircraft Structures”, Richard Pettit, August, 2000. Chief Engineer, FractureLab, LLC.

18. “An Experimental-Computational Evaluation of the Accuracy of Fracture Toughness Tests on Concrete”, James Hanson, August, 2000. Assoc. Prof., Rose-Hulman Institute of Technology.

19. “Interface Modeling of Composite Material Degradation”, Tong-Seok Han, May, 2001 (with Prof. Sarah Billington). Research Engineer, Korea Electric Power Research Institute.

20. “Modeling and Simulation of Fatigue Crack Growth in Metals Using LEFM and a Damage-Based Cohesive Model”, Ani Ural, May, 2004 (with Prof. Katerina Papoulia). Assistant Professor, Villanova University.

21. “Decohesion of Grain Boundaries in Statistical Representations of Aluminum Polycrystals”, Erin Iesulauro, May, 2006. Staff Engineer, Los Alamos National Laboratory.

22. “A Hierarchical, Probabilistic, Damage and Durability Simulation Methodology”, John Emery, May, 2007, Staff Engineer, Sandia National Laboratory.

23. “Finite Element Simulation of Fatigue Crack Stages in AA 7075-T651 Microstructure”, Jacob Hochhalter, May, 2010, Staff Engineer, NASA Langley Research Center.

24. "Geometrically explicit finite element modeling of AA7075-T651 microstructure with fatigue cracks", Michael Veilleux, August, 2010, Senior Member of Technical Staff, Sandia Livermore National Laboratory.

25. “Microstructural Simulation of Fracture Processes in Cortical Bone”, Erin Oneida, December, 2013 (expected).

26. “Residual Strength of Damaged Aerostructures”, Ashley Spear, NSF Graduate Fellow, May, 2013 (expected).

27. “DDSim for Composite Structures“, Brett Davis, May, 2013 (expected).

28. “Geometrical Simulation of Complete Process of Microstructurally Small Fatigue Cracking “, Albert Cerrone, December 2013 (expected).