Gerald T. Jeka

2915 w. 101st Street ● Evergreen Park, IL 60805 ● Mobile: 708-539-9537 ● gjeka@comcast.net
Gerald T. Jeka's Work Portfolio Website: http://www.geraldjeka.synthasite.com

Technical Areas:

- Materials Failure Analysis
- Scanning Electron Microscopy (SEM)
- Energy Dispersive X-ray Spectrometry (EDS)
- Optical Microscopy w/ Digital Image Analysis
- Fourier Transform Infrared Analysis (FTIR)
- Materials Characterization
- Research and Development
- Test Program Coordination
- Project Management
- Method Development
- Metallurgical Sample Preparation
- Data Acquisition/Analysis
- Technical Report Writing
- Literature Review
- Laboratory Set-up/Management
- Design of Experiments
- Evidence / Field Inspection
- Product Development / Testing
- Deposition Review/Summarization
- Technical Litigation Support
- Mechanical Testing
- Nondestructive Evaluation
- Custom Testing
- Instrumented Impact
- Flammability Testing
- Fractography
- Boroscopy
- Microtomy

Summary of Qualifications

Broad engineering background as a skilled engineering assistant, failure analyst and microscopist with a long history of working closely with senior scientists, engineers, attorneys, insurance agents and industrial clients, across civil, mechanical and materials engineering disciplines, while working at Argonne National Laboratory, IIT Research Institute, two consulting/testing firms and an industrial microscopy and microanalysis laboratory.

Extensive experience managing materials failure analysis projects and litigation cases. Managed a SEM and optical microscopy laboratory, training staff members in the proper use of laboratory equipment and software. Setup a laboratory that included a heat release rate apparatus and custom test facilities for material flammability experiments. Attained FAA laboratory certification for Heat Release Rate Testing of Aircraft Interior Materials and awarded Designated Engineering Representative (DER) status. Developed methods for materials preparation and custom testing.

Experience in engineering project management having successfully led a large-scale product development project done on time, under budget, leading to an additional follow-on project.

Solid technical aptitude, organizational, supervisory, computer and problem solving skills. Strengths include attention to detail, dependability, willingness to explore new areas and ability to handle multiple tasks simultaneously.

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Work Experience

Argonne National Laboratory, Energy Systems Division, Tribology Group, July 2010 – Present
Engineering Assistant / Consultant

Provide engineering assistance on research projects related to tribological testing, scaling-up an industrial size ultra-fast electrochemical Boriding (molten salt heat-treating) process and failure analysis of wind turbine gearbox bearings.

Expertise utilized includes use of laboratory instrumentation, data acquisition/analysis, method development, metallurgical sample preparation, microhardness, optical microscopy and SEM microscopy, energy dispersive x-ray analysis, interferometery, pin-on-disk, abrasion testing, material selection, procurement, fixture design using Solidworks, and acting as a liaison with the machine shop and outside services. Manage metallurgical sample preparation laboratory.

Packer Engineering, Technical Services, July 2009 – December 2010
Adjunct Consultant

Project work involved materials and plastics failure analysis, providing technical services such as SEM/EDS microanalysis, optical microscopy, FTIR spectroscopy, fractography, materials evaluation, metallurgical sample preparation, non-destructive evaluation, data acquisition, melt flow rate testing, evidence and field inspection, and technical report writing.

Experience managing materials failure analysis projects involving various consumer products such as plastic pipes, polymers, paints, films, filters, medical devices, valves, disposable cigarette lighters, glass fiber reinforced composites, sporting goods, building materials and automotive components.

BP Amoco Research Center, Microscopy and Microanalysis Laboratory, Oct. 2008 – July 2010
Electron Microscopist, contractor (10 months over 2 contract periods)

Work experience includes optical and scanning electron microscopy, energy dispersive x-ray spectroscopy, semi-quantitative analysis, elemental mapping, digital microscopy, contaminant analysis, corrosion analysis, metallurgical sample preparation and technical report writing.

Provided in-house failure analysis and microanalysis services associated with purified terephthalic acid, fuels, and oil refinery production processes for root cause and corrective action. Materials characterization and evaluation includes metals, metal oxides, polymers, catalysts, contaminants and corrosion products.

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Work Experience (continued)

Bodycote Testing Group (formerly; L.J. Broutman & Associates, Ltd.) 1988 – 2008
Microscopist/Failure Analyst, July 1999 - August 2008

Technical areas include project management and performing hands-on materials failure analysis, optical and scanning electron microscopy, x-ray microanalysis, fractography, microtomy, field inspection, evidence inspection, digital imaging, sample preparation, literature search, strain gauging, billing, technical document and deposition review/interpretation, and technical report writing. Managed microscopy laboratory and trained staff members in proper use of microscopes, measurement calibration and related analytical software usage.

Worked in conjunction with the polymer chemistry laboratory, possess working knowledge of spectroscopy and thermal analysis equipment (including FTIR, DSC, TGA, TMA, GC-MS and GPC). Routinely worked directly with industrial clients on projects and with attorneys on litigation cases including patent issues.

- Co-authored a paper on Anisotropy in Thermoplastic Elastomers – Part III, Topical Conference, May 2003, utilizing the SEM microscope to characterize stained polymers.

L.J. Broutman & Associates, Ltd., 1991 – 1999
Project Manager

Worked on and managed laboratory projects related to industrial failure analysis, product liability cases and patent issues. Developed customized flammability tests. Directed project work to the chemistry and mechanical engineering departments and utilized optical and SEM microscopy to achieve project objectives. Other tasks included product development and testing, and technical deposition review and summary as a basis for expert witness testimony.

- Setup a flammability laboratory that included an OSU Heat Release Rate Apparatus and custom test facilities for material flammability experiments.
- Awarded **Designated Engineering Representative** (DER) for an aircraft interior materials flammability heat release test apparatus, specified data acquisition software requirements and achieved FAA certification for the laboratory.
- Led a product development project and designed/fabricated a pressure sensitive load map distribution sheet used on bedding systems, managing outside consultants, machine shop services and laboratory staff to guide the project to its successful conclusion, resulting in a follow up program.

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Work Experience (continued)

L.J. Broutman & Associates, Ltd., 1988–1991
Senior Experimentalist

Skill base includes mechanical testing, fixture design, metallurgical sample preparation, field inspection, evidence inspection, optical microscopy, boroscopy, instrumented impact, abrasion testing, wear testing, product testing, thermal cycling, ultrasonic inspection, instrument specification, calibration and maintenance. Provided technical litigation and laboratory support to senior staff members. Managed laboratory projects related to product failure analysis and material characterization.

- Successfully demonstrated that a manufacturing defect misdiagnosed by an opposing expert's improper inspection procedure caused spoliation of evidence resulting in an early settlement, a change in the future inspection procedure by that opposing expert and the effective end of this type of claim.

IIT Research Institute, Mechanics of Materials Department, 1973-1988
Senior Experimentalist

Research performed involved material characterization studies on ceramics and composites for turbine engine applications and experimental material evaluation studies on building materials, including concrete and soils.

Mechanical testing skills involved tension, compression, shear, flexure, creep and creep rupture. Physical testing experience included thermal shock, thermal expansion, thermal cycling, weathering, water vapor transmission, sonic modulus of elasticity, and nondestructive evaluation.

Additional skills included optical microscopy, fractography, metallurgical sample preparation, strain gauging, test fixture design, database management, data analysis, preparation of technical presentations and creating cost estimates for test programs.

- Worked in conjunction with the American Society for Testing and Materials (ASTM) Subcommittee C18.01 in the development of a new test method for the abrasion resistance of stone using the Taber Abraser

- Developed custom test methods for the mechanical testing for building material cladding applications.

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Education

A.A.S. Moraine Valley College, Palos Hills, IL – **Non-Destructive Evaluation**, 1987
This degree was the *major* of a Bachelor of Science degree offered in conjunction with Lewis University with Avionics (aviation electronics) as the minor. Main curriculum includes: Industrial radiography and x-ray film interpretation, blue-print interpretation, eddy-current testing, magnetic particle and liquid penetrant, weld inspection, surface evaluation and ultrasonic evaluation.

A.G.S. Richard J. Daley College, Chicago, IL – **General Studies**, 2009

Chemistry/Civil Engineering, Coursework - Illinois Institute of Technology, Chicago, IL, 1982-84

Continuing Education

2009 **McCrone College of Microscopy**, Westmont, IL

- Polarized Light Microscopy Workshop

2008 **Penn State Erie, The Behrend College,** Erie, PA

- Injection Molding Troubleshooting, Professional Development Training Program, 19 hours, 1.9 CEUs

2007 **Perkin-Elmer,** Westmont, IL

- Materials Characterization Workshop

2005 **McCrone College of Microscopy**, Westmont, IL

- Scanning Electron Microscopy (40 hours)

2004 **Princeton Gamma Tech,** Princeton, NJ

- EDS Microanalysis System Users School Certificate

2003 **Dialog Corporation,** Chicago, IL

- Intermediate Literature Search Techniques
- Advanced Power Searching Literature Search Techniques
- Developing Patent Research Expertise

2003 SPE Failure Analysis of Plastic Products through Stress Analysis Methods Seminar

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2001 **Moraine Valley College, Palos Heights, IL**

- Introduction to 3D animation
- Advanced 3D animation

2001 **SPE Plastics Fracture Analysis Workshop Seminar**

- Covers Fractography, Material Behavior, Fracture Mechanism and Fracture Mechanics

2001 **SPE Plastics Failure Analysis/Prevention and Testing**

- Non-Design Factors Determining Product Performance
- Selecting Properties to Test
- Analytical Methods and Physical/Mechanical Testing

Certificates

- Injection Molding Troubleshooting, Penn State Erie, The Behrend College, 2008
- Scanning Electron Microscopy, McCrone College of Microcopy, 2005
- EDS Microanalysis System Users School, Princeton Gamma Tech, 2004
- Surface Evaluation Specialist, Moraine Valley College, 1986-1987
- Ultrasonic Specialist, Moraine Valley College, 1986-1987
- Industrial Radiography Specialist Moraine Valley College, 1986-1987

Honors and Awards

- Designated Engineering Representative, FAA, Heat Release Rate of Aircraft Interiors, 1992

Affiliations

- Midwest Microscopy & Microanalysis Society
- American Society for Testing and Materials, Committee E5
- International Aircraft Material Fire Test Working Group
- American Society for Nondestructive Testing
- National Fire Protection Association

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Microscopy Experience

Optical Microscopy:

- Olympus STM6 Measuring stereo-optical microscope with image analysis
- Phase Shift Technologies MicroXAM Profilometer
- Olympus SZH-10 research grade stereo-optical microscope with PAX-IT digital image analysis system
- Nikon Optiphot-M Trinocular Metallurgical Microscope for Reflected Light Brightfield and Darkfield
- Olympus BX50 Transmitted and Reflected Light Microscope
- Keyence VHX-500 digital video microscope system

SEM microscopy:

- Leica Cambridge Stereoscan S360 with PGT IMIX EDS software
- Hitachi S3200 SEM with Noran Voyager EDS software
- JEOL SEM with Oxford Inca EDS software (training at McCrone)
- JEOL 840A SEM with Thermo Noran System Six EDS software
- JEOL 5900LV SEM with Oxford Inca EDS software
- FEG-SEM: FEI Nova 600 NanoSEM w/Thermo Noran System Six EDS software
- FEI Quanta 400F ESEM w/ 4Pi Revolution EDS software
- Hitachi S4700 SEM w/ EDAX Genesis EDS software
- FEI Nova 600 NanoSEM w/ Thermo Noran System Six EDS software (training)

Interferometery:

- Phase Shift Technology MicroXAM Surface Mapping Microscope