

T. David Burleigh, Ph.D. & P.E.
Professor of Materials & Metallurgical Engineering

Curriculum Vitae

Materials & Metallurgical Engineering Department
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SUMMARY

Metallurgist and Corrosion Specialist with excellent teaching skills. Research has focused on unraveling corrosion mechanisms and designing corrosion resistant alloys and coatings. Expertise with the nanotechnology of the metal/environment interface, and routine use of electrochemistry, photoelectrochemistry, electron microscopy, and glancing angle x-ray diffraction for failure analysis, and for understanding corrosion and passivity. Research has been recognized through many patents and publications.

EDUCATION

- Postdoctoral Research** FRITZ-HABER-INSTITUT MPG, West Berlin, Germany
Research topic: Photoelectrochemistry of Passive Metals. 1986-1987
- Ph.D. in Metallurgy** MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, MA
GPA 4.8/5.0. Dissertation topic: Corrosion. 1981-1985
- M.Sc. in Metallurgy** MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, MA
GPA 4.9/5.0. Thesis topic: Welding. 1978-1980
- B.Sc. in Mineral Engineering-Physics**, COLORADO SCHOOL OF MINES, Golden, CO
GPA 3.8/4.0. Minor: Physical Metallurgy. 1974-1978

PROFESSIONAL EXPERIENCE

NEW MEXICO TECH, Materials & Metallurgical Engineering, Socorro, NM, 2001-present
Chair (2019-present), **Co-Chair** (2017-2019), **Professor** (2010-present), **Associate Professor** (2001-2010) <www.nmt.edu/academics/mtls/>

- Developed and taught the following courses; ES 201 "Statics," ES 302 "Mechanics of Materials," MATE 202 "Materials Engineering I," METE 327 "Physical Metallurgy," MATE 314 "Transport Phenomena," MATE 382 "Intro to Engineering Design," MATE 570 "Corrosion Phenomena," MATE 560 "Failure Analysis," and MATE 540 "Electrochemical Techniques & Processes." The overall quality of instruction averages 4.5/5.0 as evaluated by the students.

- Funded research grants and contracts from the Center for Teaching Excellence, Sandia University Research Program (SURP), WERC, Copper Development Association, Chevron Energy, and Xurex Special Chemicals.
- Established a corrosion research and surface studies laboratory.
- Academic advisor for many M.Sc. degrees and Ph.D. degrees.

MUGLA SITKI KOCMAN UNIVERSITY, Metallurgy & Materials Engineering. 2016
Visiting Foreign Professor (sabbatical spring semester).

- Taught two courses, "Failure Analysis" and "Corrosion."

UNIVERSITY OF ERLANGEN-NUREMBERG, Werkstoffwissenschaften. 2007-2008
Visiting Professor (sabbatical year).

- Research on anodized steel and presented many lectures on electrochemistry.

UNIVERSITY OF PITTSBURGH, Mat. Sci. & Eng. Dept., Pittsburgh, PA. 1993-2001
Research Associate Professor (1997 to 2001), **Associate Director of the MRC** (1995-1997),
Research Assistant Professor (1994-1997), **Research Associate** (1993-1994).

- Taught "Statics and Mechanics of Materials I and II," "Statics and Particle Dynamics," "Mechanics of Materials," and lab instructor for "Materials Structures & Properties." Teaching typically rated >4 on a scale 1-5.
- Taught professionals, "Introduction to Corrosion Science," and "Introduction to Physical Metallurgy" both in the Continuing Education night school and as an external short course.
- Directed the photoelectrochemistry and aqueous corrosion laboratory. Funded research from Liz Claiborne Accessories, EPRI, Teledyne Wah Chang and Office of Naval Research. Grants and contracts totaled \$397,032.
- Directly supervised one M.Sc. thesis and eight B.Sc. theses.
- Failure analysis of orthopedic implants and dental implants with students and doctors of the University of Pittsburgh Medical Center (UPMC).
- Visiting Scientist for Lehigh University, conducting joint research for Pennsylvania Dept. of Transportation (1999-2000).
- Assisted writing reports and grant proposals in the Materials Research Center (MRC).

BURLEIGH CORROSION CONSULTANTS, Murrysville, PA, & Socorro, NM, 1993-present
Principal Investigator <www.corrosionhelp.com>.

- Failure analyses and solving corrosion problems for over one hundred small and large businesses.
- Registered "Professional Engineer in Metallurgy," in New Mexico. Certified "Corrosion Specialist" by NACE International.

ALUMINUM COMPANY OF AMERICA, Alcoa Center, PA 1987-1993
Staff Engineer (1991-1993) and **Senior Engineer** (1987-1991).

- Patented a magnesium-lithium alloy with excellent resistance to saltwater corrosion. Co-inventor on a patent for a low-cost magnesium-scandium master alloy.
- Installed a photoelectrochemistry lab and an electrochemical impedance spectroscopy lab. Directed failure analysis of failed products to determine cause and remedy and designed corrosion test programs (e.g. EIS) to determine corrosion resistance of new products.
- Co-instructor for a short course on "Corrosion of Aluminum Alloys."

FRITZ-HABER-INSTITUT (MAX-PLANCK SOCIETY), Berlin, West Germany 1986-1987
Visiting Research Scientist (post-doctoral studies) funded by the Alexander-von-Humboldt Foundation and supervised by Professor Dr. Heinz Gerischer.

- Published a theory to explain the active/passive transition of corroding metals. Presented the photoelectrochemical studies on tin in German at the Busentagung meeting.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, MA 1981-1986
Materials Science and Engineering Department, **Postdoctoral Researcher** (1985-1986) and **Research Assistant** (1982-1985) in the H.H. Uhlig Corrosion Laboratory supervised by Professor R.M. Latanision. **Teaching Assistant** under Professor A. Witt (1981).

- A.B. Campbell Award for "Best Paper by an Author under 30 Years of Age," (NACE 1988), and Melvin Romanoff Award for "Best First Paper," (NACE Northeast Region, 1992).
- Awarded the H.H. Uhlig Student Award, by the National Association of Corrosion Engineers (NACE) - Boston Section (1984).
- Awarded the MSE Dept. "John Wulff Award for Excellence in Teaching" (MIT 1982).

CENTRO MEDICO SAN JOSE, Taisha, Ecuador 1981
Volunteer Handyman for six months at an isolated medical clinic in the Amazonian rain forest.

- Repaired the radio, electrical, plumbing, and wooden structures.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, MA 1978-1980
Materials Science and Engineering Department, **Research Assistant** (1979-1980) in the Welding Laboratory supervised by Professor T.W. Eagar. **Teaching Assistant** under Professors A. Witt (1978) and R. Ogilvie (1979).

- M.Sc. thesis and publication from the welding lab.

SOLAR ENERGY RESEARCH INSTITUTE, Golden, CO 1978
Summer Intern under Dr. S. Wagner.

- Co-authored publication with Drs. S. Wagner and T.F. Cizek on ellipsometry.