

## **RESUME**

### **THOMAS W GURLEY**

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#### **ACCOMPLISHMENTS**

Awarded second Fulbright scholarship (US State Dept) to teach chemistry at Uganda Christian University (2012-13) and Fulbright Specialist (2013-2018).

Established a chemistry teaching laboratory at Uganda Christian University in Mukono, Uganda. Developed curriculum for teaching chemistry lab courses in biochemistry and food chemistry (2013).

Formed a soil analysis start-up company, GREEN UCU, in Uganda and trained 9 students how to organize a technical company, develop a business model, and train the students in the lab procedures and analytical procedures (2013)

Taught chemistry and polymer chemistry courses at University of Akron (2008), Kent State University (2009), Malone University (2009), Trident Technical College (2015), and College of Charleston (2015). Awarded Polymer Teacher of the Month in August 2009 by the Akron Global Polymer Academy – University of Akron

Conducted workshops on Medical Elastomer Technology at the Akron Polymer Training Center for continuing education which is part of the University of Akron College of Polymer Science and Polymer Engineering. Taught polymer science to high school students in a summer program – Upward Bound Science and Math – University of Akron – for students from low income families.

Launched a successful consulting business focused on analytical science related to polymers and medical applications (2007)

- Awarded SBIR grant to develop method for diagnosing malaria (2008)
- Developed analytical method to measure surface chlorine on medical rubber parts
- Gave keynote speech at polymer processing conference for Pharma company
- Consulted on medical rubber components at 2 Pharma companies
- Wrote Phase I and II SBIR proposals to the US Army for malaria research

Awarded first Fulbright scholarship to conduct research in analytical chemistry in Ukraine (2007)

Managed a R&D group focused on the development of elastomeric formulations for pharmaceutical applications (1996-2006)

- Managed the development of rubber injection-compression molding technology for the production of pharmaceutical elastomer closures and IV set components

- Coordinated the conversion of several pharmaceutical and consumer products from rubber compounds containing natural rubber to a synthetic polyisoprene equivalent material
- Develop a diode array/fiber optic based clear acrylic multicuvette analyzer as a QA release test for production of the medical diagnostic cuvettes to insure optical clarity

Managed a R&D group focused on rubber analytical chemistry (1982-1991)

- Developed 30+ analytical methods based on chromatographic techniques
- Initiated PAC program including Center for Process Analytical Chemistry sponsorship, purchased 5 process analyzers i.e. NIR and fiber optic remote spectroscopy (FORS)
- Demonstrated the application of FORS (fiber optic remote spectroscopy) for monitoring polymerization catalyst levels, determining percent polymer solids in polymer cement, measuring acrylonitrile in an aqueous recycle stream, monitoring molten (250°C) PET, and tracking uniformity of rubber mixing in an extruder
- Developed NIR reflectance and transmission methods for measuring polymer functional groups, polymer additives, polymer microstructure, silicone in resin, oil in rubber, powdered chemical mixture compositions, and ppm levels of an organic solvent in wastewater

## **PROFESSIONAL EXPERIENCE**

### **Uganda Christian University**

2015-2017

Fulbright Specialist

Taught a 2 week short course (2016) on HPLC theory and method development. Assisted at the Food Science department to determine vitamin A and E in sweet potatoes and shea butter using HPLC. Taught practicals for 3 weeks (2017) in biochemistry and food chemistry in the Agricultural Science department.

### **College of Charleston/ Trident Technical College**

2015

Taught introductory chemistry labs to engineering and non-science majors

### **Uganda Christian University**

2015

Fulbright Specialist

Assisted in writing an introductory college chemistry primer for both lectures and labs for East Africa. Taught classes on soil analysis. Set-up newly purchased chemistry lab equipment

### **Smithers Rapra Inc**

2013- present

Analytical Chemist

Developed, conducted, and oversaw analytical testing on polymers and additives using gravimetric, spectroscopic, and wet chemical methods including HPLC, GCMS,  $^1\text{H}$  and  $^{13}\text{C}$  NMR, ICP and AA for metals, FTIR, Karl Fischer for water, Soxhlet extractions, total sulfur analysis, ash analysis.

### **Uganda Christian University**

2012-2013

Fulbright Senior Lecturer

Taught introductory chemistry to nurses and food chemistry and biochemistry to agricultural science students. Co-taught Special Projects course for agricultural students on how to write a research proposal. Assisted in establishing the first chemistry laboratory at

UCU (Mukono, Uganda) for teaching practicals (labs). Formed a soil analysis company with 6 students to provide soil knowledge and wisdom to the farmers in Uganda.

### **SD Myers Inc.**

Innovation Center Consultant

2013-2014

Directed research projects involving identification of organic acids present in transformer oil using titrimetric analysis and chromatographic analysis - HPLC & GCMS.

Director of the Myers Innovation Center

2011-2013

Established an R&D program to bring new technology and products into the company for future development.

Director of Diagnostic Analytical Services

2010-2011

Directed an analytical chemistry laboratory consisting of 43 technicians, scientists, and administrative personnel. The lab uses state-of-the-art analytical tools (headspace gas chromatography with FID, TCD, and ECD detection, automated HPLC and FT-IR, inductively coupled plasma- optical emission spectrometry, and several wet chemical techniques including Karl Fischer non-aqueous titration, acid number titration, interfacial tension, and specific gravity). The lab supports the largest lab/business in the North and South America that maintains electrical transformers by providing a complete diagnostic analysis of their insulation fluid and providing education and services to maximize their lifetime.

### **Manning Wood LLC**

President

2007-present

Launched a technical consulting business. Consulted in the area of analytical science related to polymers and pharmaceutical applications.

Served several clients in the US and China - testing lab, environmental lab, rubber consumer products company, pharma companies, rubber pharma products company.

Refurbished and established the Karl Fischer titration method for measuring moisture in rubber samples for the testing lab. Taught Introductory Chemistry at the University of Akron, Department of Chemistry (Jan-May 2008) and Kent State University, Department of Chemistry (Jul-Aug 2008). Conducted Pharma Elastomer University seminar for two pharmaceutical companies as part of a consulting contract (Sep 2008). Awarded Phase I SBIR grant by the US Army to develop method to diagnose malaria (Sep 2008). Taught Polymer Science for the Upward Bound Math & Science program at the University of Akron (Summer 2009) and Basic Physiologic Chemistry at Malone University (Fall 2009). Joined the Sherwin Williams CRADLE (Creative R&D Lab for Entrepreneurs) to expand consulting activities to include analytical chemical lab (Sep 2009). Conducted workshop entitled "Medical Elastomer Technology" at the Akron Polymer Training Center, University of Akron (Nov 2009).

### **Institute of Single Crystals**

Fulbright Senior Research Scholar

2007

Conducted research on hydrogen bonding using microwave energy to acetylate several model iminocoumarines. These molecules are known to have biological activity. HPLC and  $^1\text{H}$  and  $^{13}\text{C}$  NMR were used to analyze the reaction products. This work was done at the Institute of Single Crystals, Kharkiv, Ukraine, which is a post-Soviet government laboratory established in 1955. Assisted in translating an organic chemistry textbook from Russian to English and negotiating a book contract with Springer to have the book published in 2008.

**Abbott Laboratories until May 2004 when it became Hospira Inc.**

Technical Director 1996-2006  
Directed five groups (25 people) – Rubber, Plastic, Latex, Process Engineering, and Tool Engineering. Provided overall direction for the research and development activities at the plant. Responsible for developing new polymeric materials, products, processes, and supporting existing manufacturing processes.

Manager Rubber Technology 1993-1995  
Managed 9 chemists and technicians including the analytical lab. Responsible for development of new rubber products mainly elastomeric closures, stoppers, plungers, reseals, baby bottle nipples, sponge, golf ball centers, and hot water bottles. The R&D group supported production of all products.

Managed the implementation of several conversion programs from natural rubber latex based compounds to all synthetic polyisoprene compounds for baby bottle nipples and IV elastomeric components. Presented seminar on isoprene polymers synthetic vs. natural latex. Managed the implementation of rubber injection molding technology for production of pharmaceutical stoppers, syringe plungers, and IV components - sleeves, flashbacks and septa. Coordinated drug closure programs for several generic drug programs at Corporate R&D. Developed program to extrude and cure polyisoprene compound into tubing for use in irrigation surgical sets. Oversaw the testing of rubber closures for moisture content using Karl Fischer titrimetric analysis.

Upgraded the analytical lab with the purchase of a HPLC (DAD) with heart-cutting capabilities into a GC/MSD for characterization of rubber stopper impurities. Obtained a superconducting  $^1\text{H}$  and  $^{13}\text{C}$  NMR spectrometer from Corporate for material testing. Solved analytical problems working cooperatively with Corporate R&D. Managed the development of a streamlined GC-TEA method for the determination of nitrosamines in baby bottle nipples. Presented seminars at Corp R&D to analytical chemists and pharmacists on Pharmaceutical Rubber Chemistry and a workshop on Analytical Chemistry of Rubber at Corporate R&D.

Sr. Analytical Chemist (QA department) 1992- 1993  
Managed 2 technicians. Responsible for analytical support for production of rubber and plastic medical and consumer products. Conducted audits in the R&D department. Supported corporate QA audit of the manufacturing plant. Developed new analytical testing instrumentation using fiber optics technology for QA release test for an acrylic clear multicuvette for clinical chemistry.

**ICI Americas, Specialty Chemicals**

Group Leader, Separation Science 1991-1992  
Managed 2 professionals and 6 technicians. Responsible for analytical support to the various businesses within the Corporation.

**Goodyear Tire & Rubber Co**

Senior Research Chemist, Methods Development (1976-1982) 1976-1991  
Developed over 30 new analytical methods for organic chemicals and polymers used in the rubber and chemical industry, trace analysis, air pollutants, wastewater, and FDA required analyses of extractables in polyester beverage containers.

Section Head, Methods Development (1982-1991)

Managed 7-15 professionals- PhDs and technicians. Responsible for developing analytical methods using GC, HPLC, GC/MS, GPC, IC,  $^1\text{H}$  and  $^{13}\text{C}$  NMR, IR, NIR, UV, AA, pyrolysis MS, fiber optic UV/NIR, flow injection analysis (FIA), and wet chemistry. These methods were designed for both R&D project support and implementation in plant analytical laboratories for QA analyses.

Major responsibilities as section head included coordinate and direct method development effort; consult/advise technical personnel on analysis problems; keep abreast of current literature to maintain application of state-of-the-art technology; evaluate and recommend purchase of analytical instrumentation, maintain inventory file of in-house analytical methods; perform administrative tasks related to personnel.

Initiated company sponsorship of the Center for Process Analytical Chemistry (CPAC) at the University of Washington, Seattle. Represented the company on the CPAC advisory board. Developed programs and expertise in process analytical techniques - fiber optic remote spectroscopy, near infrared reflectance, chemometrics, FIA, process GC, and pulsed NMR.

## **EDUCATION**

PhD, Analytical Chemistry, Case Western Reserve, Cleveland, OH  
BA, Chemistry, Houghton College, Houghton, NY

Attended several Gordon Research Conferences in the 1980s – Analytical Chemistry & Separation Science as well as Pittsburgh Conference.

Attended Polymer Morphology course coordinated by RPI in New Orleans 1993

Attended Gordon Research Conference on Elastomers New London NH 1995, 1999

Attended Analysis of Polymers, University of Twente, Enschede, Netherlands, 2002

## **MILITARY**

US Army Security Agency, German Linguist, Voice Intercept Operator (West Berlin)  
Vietnam Era Veteran 1968-1972.

## **PUBLICATIONS**

### **BOOKS**

Azaheterocycles based on  $\alpha,\beta$ -unsaturated carbonyls, V. A. Chebanov, S. M. Desenko, T. W. Gurley, Springer, 2008

### **JOURNAL ARTICLES**

Difference between  $^1\text{H}$  NMR signals of primary amide protons as a simple spectral index of the amide intramolecular hydrogen bond strength, N Gorobets, S Yermolayev, T Gurley, A Gurinov, P. Tolstoy, I Shenderovich, and N Leadbeater; J of Physical Organic Chemistry, 2012, **25**, 287-295

The Leachable Challenge in Polymers used for Pharma Applications, T Gurley, Rubber World, Nov 2008

Oxygen Permeation and Microbial Ingress through a film coated and uncoated elastomeric closure in a glass drug vial. M Andress, H Dull, T Gurley, T Berger, E Remo, and J Grillo, Journal of the Parenteral Drug Association, 2004, vol. 58 (1), 32-44

Rapid Analytical Method for the Determination of Nitrosamines in Baby Bottle Nipples, M Andress, T Gurley, and S Harsch, Rubber & Plastics News - Technical Notebook July 1998.

Determination of Microstructure and Composition in Butadiene and Styrene-Butadiene Polymers by Near-Infrared Spectroscopy, C Miller, B Eichinger, T Gurley, J Hermiller, Analytical Chemistry, 1990, 62, 1778-1785.

Determination of Terephthalic Acid at the Low Parts-per-Billion Level by Reverse Phase HPLC, T Gurley, Journal of Chromatographic Science, 1980, 18, 39-41.

Analysis of Organophosphorus Compounds at the Parts-per-Million Level by Phosphorus-31 Fourier Transform NMR Spectroscopy, T Gurley and W Ritchey, Analytical Chemistry, 1976, 48, 8, 1137-1140.

Phosphorus-31 Fourier Transform Nuclear Magnetic Resonance Spectrometry as a Trace Analysis Tool for the Determination of Inorganic Phosphates, T Gurley and W Ritchey, Analytical Chemistry, 1975, 47, 8, 1444-1446

Ph.D. Thesis Phosphorus-31 Fourier Transform NMR Spectroscopy as a tool for trace analysis of Phosphorus Compounds. Thesis Advisor: William Ritchey, Case Western Reserve University, June 1976

## **PRESENTATIONS**

Trends in Pharmaceutical Polymers in the US and Europe, Major rubber company sponsored Pharma technical conference, Xiamen, China, July 2012

Medical Elastomer Technology. Akron Polymer Training Center workshop, University of Akron, November 2009 and 2010

Synthetic Polymers used in Pharmaceutical Applications. An Overview. Wound Healing Consortium, Akron General Hospital, Akron, Ohio, March 2008

Polymers that can save lives. American Institute of Chemical Engineers regional student meeting at the University of Akron, March 2008

The Future of Polymers in Medical Applications, Keynote speaker at a pharmaceutical company's in-house worldwide technical meeting. Chicago, IL Oct 2008

Application and Limitations of TPEs for Use in Pharmaceutical Products, New Biomedical Developments in TPES, ACS Rubber Division meeting, Akron, Ohio, May 2006

Shedding the Coating Myth: A Comparison Coated and Uncoated Drug Closures, PDA Extractables Conference, poster, May 2005

Effect of Leaching on Residual Proteins in Natural Rubber, B Capen and T Gurley, International Latex Sensitivity Conference, Baltimore, MD, Nov 5-7, 1992 (poster)