

STATEMENT OF QUALIFICATIONS

for



the MiL, Inc.

MICROBE INOTECH LABORATORIES, INC.

& its owned and operated satellite laboratories:



**HELIX CENTER CORE
LABORATORY**



Microbe Scan LLC

*Celebrating Over 22 years of Excellence in Microbiology, Service and Value
Established April 1991*

- Microbe Inotech Labs, Inc. -
Introduction – Statement of Qualifications



Microbe Inotech Laboratories (the MiL inc.), is an over 22 year old biotechnology company specializing in microbiological laboratory services and microbial research in areas of rapid detection systems for the environmental, food, beverage, and pharmaceutical industries. We employ a technical staff of seven, including Ph.D. level scientists (microbiologist, parasitologist, biochemist). All lab technicians are degreed in either microbiology or biology. Our laboratory is GLP (EPA and FDA Good Laboratory Practices) compliant and we have seasoned laboratory staff members that are knowledgeable in the GLP/GMP and appropriate QA/QC protocols, and are dedicated to maintain our high levels of quality compliance (former Monsanto GLP staff initiated our GLP and Standard Operating Procedures documentation for our Environmental, Pharmaceutical, and Food laboratory entities).

Our main approximately 5,000 sq. ft. facility in St. Louis is located off of Page Avenue in the West Port Business Park within a few minutes drive of Lambert International Airport. Our modern facilities combine offices, conference room, demonstration & teaching kitchen and food, environmental and instrument laboratories. All of our employees are highly skilled in computer use and routinely deliver data electronically and customize data to be compatible with client electronic data format requests.



Microbe Inotech Laboratories, Inc.

We stand as a resource to resolve biological and biochemical issues in the marketplaces of:

- Food
- Medical
- Environmental
- Pharmaceutical
- Industrial



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Microbe Inotech Laboratories, Inc.

We specialize in microbiological identification and characterization lab services, hygiene monitoring services and the research and development of rapid microbial detection systems for the environmental (bioremediation, phyto-remediation, water/wastewater treatment and air quality), pharmaceutical (including specialized biotechnological research programs), food, and beverage industries. Our market advantages include proprietary microbial kinetic and endpoint assays, microbial databases containing profiles of over 3,000 species of microbes (including extensive *E. coli* O157:H7 and yeast identifications databases), microbial diagnostics research, product development capabilities, and specialized skills in

using automated microbial characterization and identification tools and integrating results from combined Gas Chromatography Fatty Acid Methyl Ester (GC-FAME), RiboPrinter™, Molecular Typing, and Biolog® microplate reader instruments. We also perform qPCR detection and quantitation of microbial isolates including strain subtyping by “Bacterial Bar-Codes”. Using BioMerieux’s Tempo instrument we perform automated bacterial screening of numerous products. We were selected (1996) by DuPont’s Qualicon™ subsidiary as one of their three worldwide reference laboratories to assist in building and marketing their microbial, genetic characterizing, RiboPrinter’s™ databases and instruments. The MiL, inc. has been featured in issues of Remediation Management and Lubes and Greases for our work with bioremediation and mycobacterial issues.

Our Role in Environmental Studies

We provide microbiological testing to evaluate bacteria and mycological isolates from

- Products & processes
- Contaminated air
- Soils, Waters and Wastewaters

Consulting services in microbiological issues



Microbe Inotech Laboratories, Inc.

Environmental Industry Related Services

We are USDA Certified to receive soil and groundwater samples from all over the world, including restricted areas in the southeastern United States. Our client list includes many of the top 100 environmental consulting companies involved in major commercial and government bioremediation projects, major chemical and oil companies, other commercial, academic, and government laboratories, microbial culture manufacturers, and smaller remediation companies involved with leaking UST removals and remediation. Typically, clients are provided with sterile containers to collect soil and/or groundwater samples and they ship them via overnight express mail in coolers packed with blue-ice. Our laboratory annually analyzes thousands of samples and issues hundreds of reports with full raw data appendix, with 100% on-time delivery.

Custom Assay Development to Solve Problems using Modern Instrumentation



96 well microtiter plate with redox indicator



Molecular Devices ThermoMax Reader



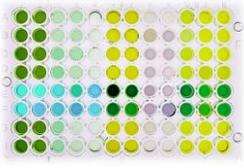
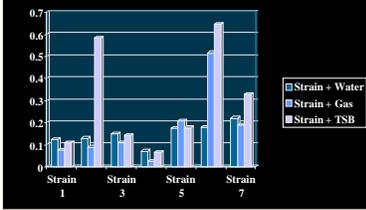
Microbe Inotech Laboratories, Inc.

Rapid microbial characterization and bioremediation degradation studies significantly reduce the time and cost to develop, implement, and monitor effective bioremediation projects, and to determine bioremediation feasibility. Microbe Inotech Lab's scientists developed three unique microbiological based environmental assays, which allow our lab to quickly perform these degradation studies. The information gained from these assays allows our scientists to recommend nutrient bioremediation techniques. Our microbial assays also provide the data input to calculate time ranges for site closure using our time tested algorithms. In addition, Gas Chromatography Fatty Acid Methyl Ester (GC-FAME) analysis identifies individual bacterial strains from more prolific and unique colonies isolated from contaminated soil and groundwater samples and are characterized by customized carbon utilization method. Each bacterial strain possesses its own distinct fatty acid signature and has unique patterns of metabolic activity with various carbon sources. Our combined identification databases possess the capability to rapidly identify and compare over 3,000 microorganisms down to the sub-species level.

Endpoint Assay

Purpose: Custom designed test to determine each bacterium's ability to degrade single or multiple contaminants. [Seven organisms vs. one substrate or five organisms vs. two contaminant substrates].

- Uses 96-well micro-titer plate
- Results illustrated in bar-chart

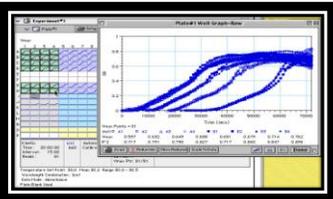



Microbe Inotech Laboratories, Inc.

The Endpoint Assay determines how well bacteria strains isolated from soil or groundwater samples are able to grow using targeted contaminants as carbon sources, compared to thousands of other strains which have been characterized and stored in our database. Once it is determined that there are efficient bacterial degraders present, a second test called a Kinetic Assay will indicate how the addition of nutrients and/or oxygen will effect the contaminant degrading bacteria's growth rate. The Kinetic Assay is similar to the Endpoint Assay in that it uses a 96-well microtiter plate, containing a tetrazolium dye that darkens proportionately to the metabolic activity of the strain. The Kinetic Assay plate is put into a microplate reader immediately after preparation and the optical density of the wells are read every 10 minutes for a total of 18 hours. Each reading is automatically plotted to create a growth curve. Comparisons of the curves from the wells with nutrients to the control wells exhibit precise information about how the addition of any substrates will affect the growth of the studied strains.

Microbial Characterization: Kinetic Growth & Inhibition Assays

96-multiwell and 384-multiwell microtiter plate assays for growth and/or inhibition (bactericidal, fungicidal, and other biocidal activities) are custom designed




Microbe Inotech Laboratories, Inc.

A third test, the Comparative Population Assay is an MPN (most probable number) test that provides an order of magnitude of the isolated bacterial degrader populations. The Comparative Population Assay differs from the Endpoint or Kinetic Assays since serial dilutions of the soil or water sample are used directly in the 96-well plate along with the contaminant – instead of just the isolated strains. After 48 hours of incubation, the plate is read in a microplate reader to determine the highest dilution at which growth is detected. This gives the MPN of the degrader populations. Positive growth control wells in this MPN assay also provide total heterotrophic plate count information.

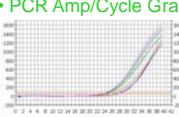
Our five-day turn around Bioremediation Feasibility Test Package combines the above assays with nutrient chemistries to provide remediation firms with more precise and scientific information to critically assess biotreatability. The five-day Bioremediation Feasibility Test Package saves time and thousands of dollars compared to our standard six-week biotreatability studies. Each Bioremediation Feasibility Test Package Includes plate counts, Endpoint Assays, GC-FAME identifications of the seven most prevalent microbe strains, and all nutrient chemistries on four soil or groundwater samples. Our Feasibility Packages include a full report with the species' names and quantitative ranking of the most efficient degrading microbes, site specific nutrient needs, and an estimated time range for site closure.

A number of microorganisms are known to possess a broad-spectrum ability to biodegrade many carbon-based contaminants in soils and groundwaters. These genera, species, and strains have different capacities and rates of degradation for each targeted contaminant. Classical methods for microbial identifications and characterizations are time-consuming, unreliable, and limited in accuracy due to a high level of dependence on operator technique. Naturally occurring and genetically altered biodegrading strains can be more adequately and completely characterized to determine their various target contaminant degradation efficiencies using existing and commercially available combinations of automated scientific instrumentation. Automated genetic molecular typing and carbon utilization pattern recognition techniques are typically utilized to characterize microbes for biodegradation. This can be accomplished through the integrated use and data correlation of automated techniques such as genetic molecular typing (modified Southern-blotting for RiboPrint® genetic patterns), Gas Chromatography Fatty Acid Methyl Ester (GC-FAME profiles), and carbon utilization pattern recognition (kinetic and endpoint 96-well microplate assays). Commercial automated genetic molecular typing systems are available which are based on the principle of modified Southern-blotting and use restriction enzyme digests as the central part of the molecular typing process. These integrated microbial characterization and identification capabilities can provide rapid and accurate analytical tools for researchers to classify (including database building of genetic, identification, kinetic, and endpoint hydrocarbon utilization profiles) and study the common genetic patterns of efficient biodegrading microorganisms. Such information will foster insights into the genetic manipulation of the specific DNA sequences that may impart enhanced degradation properties to the altered microorganism or assist in screening for the presence of such DNA sequences in the native bacterial site populations.

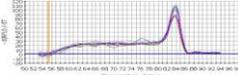
“Needle in the Haystack Detection”: Specific Microbe Detection and Enumeration by Real Time Quantitative PCR [qPCR]



• PCR Amp/Cycle Graph



• Melt Curve

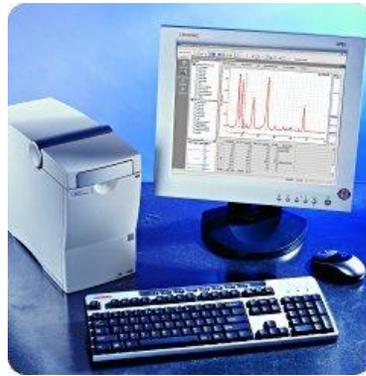


Micro Inotech Laboratories, Inc.

Microbe Inotech Laboratories – Contract Research Services

Typical research projects: Medical Device Contamination/Decontamination Studies; Fermentation Studies; Microbial Product Production and Strain Selection; Odor Control; Waste Treatment; Healthcare New Product Development Studies; Food Safety Services; Industrial and Food Product Device Development; Biotreatment and Degradation; Leading Edge Microbial Monitoring Research; Diagnostic Test Development Research – research and development of instant, sensitive, disposable, and easy to use diagnostic test kits that detect the six most common food-borne pathogens in under ten minutes without enrichment.

Bacterial Strain Sub-typing, “Bacterial Bar-Codes”: PCR Reaction Products are Examined with the Agilent BioAnalyzer 2100

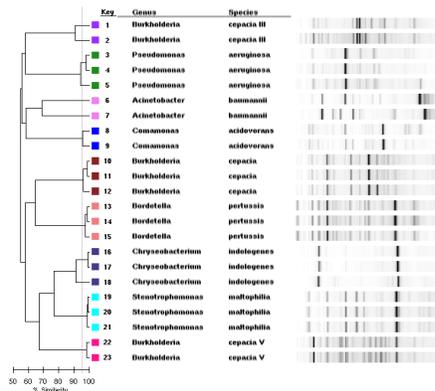


“Lab on a Chip” for DNA, RNA & Protein Analysis



Microbe Inotech Laboratories, Inc.

Source tracking using Bacterial Barcodes rep-PCR libraries



Gram Negative Non-fermenter

- Genus Discrimination
- Species Discrimination
- Genomovar Discrimination



Microbe Inotech Laboratories, Inc.

New Product Development

In November of 1996, we successfully completed a six-month Phase I Small Business Innovation Research (SBIR) grant from the U.S. Department of Agriculture (USDA) for the development of rapid food-borne pathogen test kits. In September 1997, we were awarded a three-year Phase II SBIR grant from the USDA for follow-on development, prototyping, and commercialization of rapid test kits for common food-borne pathogens. These newly developed real-time microbial test kits for *Listeria* and *Salmonella* are fast, simple, accurate, sensitive, selective, easy to use, and require no special instrumentation. Both prototype kits do not require any enrichment, are not antibody based, and can detect 100 target cells per mL, directly in the food sample aliquot in 10 minutes of total test time.



SBIR Awards

Our First Research Grant

CSREES
EDUCATION
USDA
RESEARCH • EXTENSION

**Cooperative State Research,
Education, and
Extension Service**

Phase I \$60,000/6 months
Agreement No. 96-33610-2376 5/15/96 - 11/30/96
Proposal No. 9600260

Phase II 8/31/97 -8/31/2000
\$215,000 /3 years

**"Practical Detection of Food Borne Pathogens
Utilizing Biochemically Stable Bacteriophage"**

 Microbe Inotech Laboratories, Inc.

This research is an extension of the MiL's proprietary based technology which can be readily applied to rapidly detect additional microbes of interest within the agricultural, pharmaceutical, environmental, and clinical rapid microbial diagnostic markets.

Food, Beverage, and Pharmaceutical Industries

Food and beverage processors and pharmaceutical manufacturers have limited in-plant microbiological capabilities to efficiently detect contaminating strains, track sources of contamination, identify and confirm microbial contamination in their products, and process equipment and other environmental surfaces. We offer rapid 24-48 hour bacterial confirmations of all bacterial strain types using approved GC-FAME, Biolog®, and RiboPrint® methods. In addition, our yeast database can provide rapid characterization and identifications. We also perform standard BAM method testing and use AOAC approved ELISA test kits, 3M PetriFilm™, and API strips for microbiological screening. We also provide swab sampling and ATP based hygiene monitoring services on-site for our local clients. In addition, we can conduct environmental audits and strain tracking to rapidly determine the sources of contamination. Our national client base send us their microbial cultures, slants, and other samples for confirmations and characterizations via overnight express mail for immediate testing and faxed or emailed results.

Product Screening – population counts

Automated Most Probable Number Determination by TEMPO instrument

- Total Viable Counts
- Total E. coli
- Total Staph
- Total Lactic Acid Bacteria
- Total Yeast and Mold



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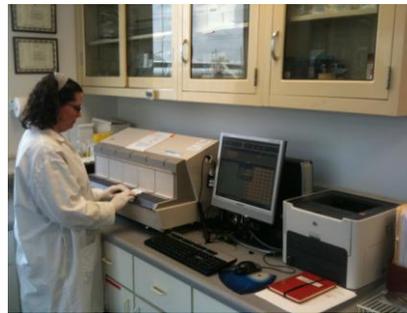
Pathogen Detection:

Automated fluorescent ELISA screening, Vitek Immuno Diagnostic Assay System [VIDAS™]

Salmonella
Listeria spp.
Listeria monocytogenes
E. coli O157
Campylobacter
Staph enterotoxin



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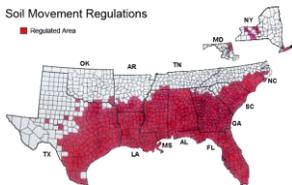
web: <http://www.microbeinotech.com>

email: info@microbeinotech.com or
bhemming@microbeinotech.com

Sample Reception



Soil Movement Regulations
■ Regulated Area



Microbe Inotech Laboratories, Inc.

- Samples are received from an overnight courier, promptly logged in, and processed for testing.

- Confirmation receipt form is e-mailed or faxed back to sender

- We are USDA permitted to receive samples from anywhere in the world
Toll Free Number:
(800) 688-9144

1. Introduction to the Standard Operating Protocols of the Labs

This is a description of the good laboratory practices for conducting non-clinical laboratory studies by Microbe Inotech Laboratories, Inc. (the MiL, Inc.) that support or are intended to support applications for research or marketing permits for products regulated by various government agencies (USDA or FDA, etc.), including food and color additives, animal food additives, human and animal drugs, medical devices for human use, biological products, and electronic products or other manufactured items. Our main concern is to assure the quality and integrity of the data generated, particularly as it relates to safety. We also include our standard operating practices for microbial isolations and identification for standard routine procedures. Our laboratories are active in environmental microbiology, including biofeasibility studies, and additionally in the food and pharmaceutical areas providing the following service functions:

1. Basic research determines the characteristics of microorganisms important in foods and products and the factors that affect their growth and survival
2. Applied research uses basic information to develop and test new food products and microbiological methods.
3. Quality control monitors food or product production to detect deviations from good manufacturing practices, to assure conformance to criteria, and to detect contaminants.
4. Investigative activities seek to determine the causes of food-borne illness and spoilage problems or origin site of contamination.
5. Sterility testing.

Non-clinical laboratory studies mean *in vivo* or *in vitro* experiments in which test articles are studied in test systems under laboratory conditions to determine their safety. The type testing does not include basic exploratory studies carried out to determine whether a test article has any potential utility or to determine physical or chemical characteristics of a test article or sample. Microbe Inotech Laboratories, Inc. permits authorized employees of the Food and Drug Administration, the United States Department of Public Health, the United States Department of Agriculture, the US EPA, and other State and Federal Agencies reasonable access, at reasonable times, and in a reasonable manner for the purpose of facility inspection and inspection of records and specimens required to be maintained regarding studies within the scope of their jurisdiction.

Each individual at the MiL, Inc. engaged in the conduct of or responsible for the supervision of a study shall have education, training, and experience, or combination thereof, to enable that person to perform assigned functions. We maintain a current summary of training and experience for each employee. Projects are completed by assigning sufficient number of personnel for the timely and proper conduct of the study to be completed. Our employees are trained to take necessary personal sanitation and health precautions designed to avoid contamination of test and control articles and test instrumentation. This includes, for particular functions, the appropriate clothing and changes of clothing necessary to prevent microbiological or chemical contamination of instrumental systems, test samples, and controls. All employees are cautioned that, should an illness befall them, they may adversely affect the quality and integrity of a project that they should exclude themselves from direct contact with instrumentation, test samples and control items, and any other operation or function that may affect the study. In case of doubt, our lab supervisors may exclude a scientist or technician from the project. Personal use of antibiotics by laboratory personnel is also reported to the laboratory management.

For contract studies, the project director is typically one of our principal or senior scientists or lab manager. This director for the project assures that test and control samples or reagent mixtures have been appropriately tested for identity, strength, purity, stability, and uniformity, as applicable. The study director has overall responsibility for the technical conduct, as well as for the interpretation, analysis, documentation, and reporting of results, and represents the single point of control for the project. This is done to provide that all experimental data, including observations of unanticipated responses of a system are accurately recorded and verified. Unforeseen circumstances that may affect the quality and integrity

of the non-clinical laboratory study are noted when they occur, and corrective action is taken and documented. All raw data, documentation, protocols, specimens, and final reports are transferred to the archives during or at the close of the study. As part of our quality control, we maintain a master schedule of all studies conducted at the facility indexed by client, project number and date, nature of the study, and current status of project.

GLP Studies with SOPs



Our facilities were designed to facilitate the proper conduct of the service we provide. This includes the design of a degree of separation, which may result in any function or activity from having an adverse affect on various projects. Disposal facilities are so provided as to eliminate or minimize infestation, cross contaminations, odor, disease hazards, and environmental contamination. We provide laboratory space, as needed, for the performance of routine and specialized procedures. Our location, consisting of newly built out improvements, is a modern, clean facility, in which approximately 4,700 square feet is dedicated solely to our work, having been created per design in January, 2014. We have laboratories for food and pharmaceutical microbiology, environmental microbiology and chemistry, a common instrument lab, a media preparation kitchen, and an area for analytical fermentation / wastewater / bio-reactor studies of various types, a sample reception area, an archival room and several private offices, conference/break training room, and a demonstration/test food kitchen. Instrumentation used in generation, measurement, or assessment of data and the equipment used for facility environmental control is of appropriate design and adequate capacity to function according to our protocols and needs. We have recently added an additional 32 feet to approximately 225 linear feet of 30" depth bench-tops for our services. We have two separate HVAC systems and space for operations, inspections, cleaning, and maintenance. Our standard operating procedures are outlined herein, and set for sufficient detail of the methods, materials, and schedules used in routine inspection, cleaning, maintenance, testing, calibration, and/or standardization of equipment, and specify, when appropriate, the remedial action to be taken in the event of failure or malfunction of instruments. Record is kept of non-routine repairs performed on instruments as a result of failure and malfunction. Such records document the nature of the defect, how and when the defect was discovered, and any remedial actions taken in response to the defect. Our laboratories have immediately available laboratory manuals and standard operating procedures being performed, which include published literature by the manufacturers of our instruments and equipment. We require all reagents and solution in the laboratory areas to be labeled to indicated identity, titer or concentration, storage requirements if other than ambient, and expiration date. Deteriorated or outdated reagents and solutions are not used. We maintain a separate storage area for foreign soil samples in compliance with our permit, S-4185 (Revised), from the USDA, Animal and Plant Health Inspection Service, which allows us to service all foreign as well as regulated areas within the United States.

Many methods offered by the MiL, Inc. are Standard Methods per the 22nd Edition (2012) *Standard Methods for the Examination of Water and Wastewater* or as described in *ASTM Standards on Materials and Environmental Microbiology*, (2006 edition); or *Compendium of Methods for the Microbiological*

Examination of Foods, 5th Edition; or the 8th Edition of the *Bacteriological Analytical Manual (BAM)*, (1998 Revision A, with e-updates as of 2013) published and distributed by AOAC International, Arlington, VA.. A particular method may be specified by our clients for a particular service, otherwise Microbe Inotech Laboratories will make a selection from the above or in addition from the American Public Health Association's *Standard Methods for the Examination of Dairy Products*, or *Recommended Procedures for the Examination of Seawater and Shellfish*, or from the US EPA's *Standard Methods for Water Analysis*. Additional methods have been developed uniquely by Microbe Inotech Laboratories, Inc.; as well as others, which are based upon instrument manufacturer quality control parameters.

2. Abstract of Code of Ethical and Professional Practice

WHEREAS, the goal of an Environmental Profession or Manager is to be of the highest moral principals in providing knowledgeable decision relating to the planning and management of environmental activities in which industry, government and public may place their complete confidence, THEREFORE, this Code of Ethical Practice shall govern the professional activities of National Registry of Environmental Professional (NREP) registrants:

- To practice only in those areas of environmental science, safety, health, or technology in which professional competence has been attained;
- To emblazon documents with the NREP seal, name or initials only when such documents are complete and contain only your work or work done under your personal, direct supervision and for which you can attest that all information is true and complete;
- To take all appropriate measure to prevent any conflict of interest that could compromise the planning and management of environmental activities;
- To perform assigned or contracted environmental planning and management duties always in a professional manner respectfully of laws and regulations and the needs and concerns of others;
- To use the best principals of environmental science, health, safety, and technology in planning and management to protect and enhance environmental quality;
- To cooperate with all levels of government in the furtherance and development of appropriate public policies supportive of environmental quality, occupational health, and safety;
- To comply with applicable environmental quality, occupational health and safety, and product safety laws and regulations;
- To manage facilities in a manner to protect health and safety of employees and individuals in surrounding communities;
- To fully disclose in writing to employers/clients all known positive and negative impacts to the environment of assigned activities, duties, and/or responsibilities;
- To refrain from using the name of the National Registry of Environmental Professionals or its seal in any activity not previously approved by the Board of Directors.



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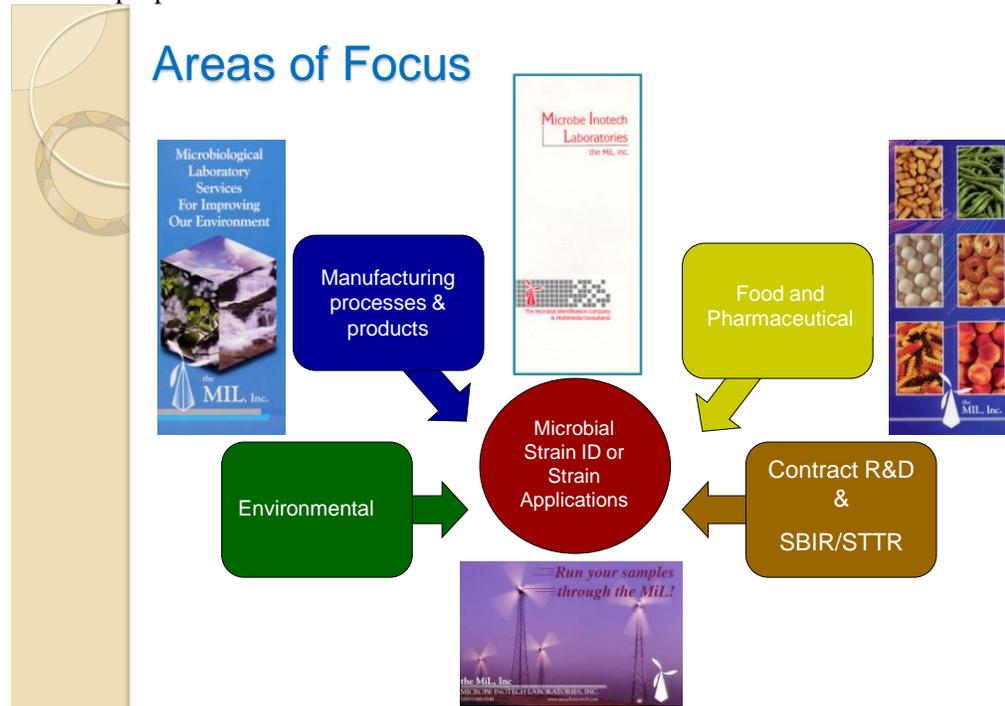
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- Microbiological Testing -

Microbe Inotech Laboratories, Inc. (the MiL, inc.) is a specialized microbial analysis laboratory, expert at isolating, counting, identifying, comparing, and confirming microorganisms in medical healthcare, environmental, food, dairy, and pharmaceutical samples. The MiL, inc. provides quality and objective microbiological and specialized biochemical analytical services to a nationwide client base within the food, agricultural, pharmaceutical, medical healthcare, and environmental industries. We are committed to providing reliable and on-time results utilizing the most advanced, efficient and cost effective analytical techniques available. The MiL, inc. offers more capacity, higher level capabilities, and quality services within the microbiology areas in comparison to any of the typical broad service testing laboratories in the marketplace. We are not a human diagnostic clinical laboratory and do not accept samples for this direct purpose; however, our databases for microbial identifications are significantly larger than the typical hospital clinical lab, and we do identify pathogens for clinical laboratories for research purposes.



Our independent microbiological laboratories are staffed with skilled and knowledgeable Ph.D. Microbiologists and Biochemists. The MiL, Inc.'s lab managers and technicians are all degreed in Microbiology to ensure that our clients receive rapid and accurate services, and quality reports. Services include isolation, enumeration, identification, and confirmation of human and plant pathogenic organisms, industrial hygiene, and medically related organisms, indicator, and spoilage organisms. Our labs conduct challenge and microbial shelf life studies, sanitation audits, environmental surface sampling, air microbial testing, Biotreatment, biodegradation, and biofeasibility tests, QA and HACCP consultation, method development and validation, and R&D analyses.

All tests are conducted in compliance with a wide range of appropriate and approved methodologies. The MiL is USDA recognized and approved methods include FDA, USDA, AOAC, BAM, AACC, USP National Standard Operating Procedures (SOP), the Associate of Official Analytical Chemists (AOAC), United States/European/British Pharmacopeia (USP/EP/BP) and the Cosmetic, Toiletry & Fragrance Association (CTFA) specifications where applicable.

Rapid computerized Gas Chromatography Fatty Acid Methyl Ester (GC-FAME) and Biolog™ metabolic characterizations, identifications, and **confirmations are available within 24 hours**. Our extensive computerized databases contain thousands of species of microorganisms and includes aerobic/anaerobic bacterial strains (including *E. coli* O157:H7 strains and clinical aerobes), yeasts, fungi, and

actinomycetes. Once our client's most elusive bacteria are identified, we retain their identifying GC-FAME signatures and Biolog™ profiles within our confidential databases for future reference by the client.

We are conveniently located within two miles of several overnight delivery services. Customers send overnight, express mail delivered, product or environmental samples or as swabs or as isolated strain cultures in coolers for rapid 24 hour testing for pathogens such as *Legionella*, *Salmonella*, *Listeria*, *E. coli* O157:H7, *Campylobacter*, *Shigella*, *Pseudomonas*, and *Staphylococcus aureus*. Our recent expansion into new microbiology laboratories and offices encompass an area of 4,700 sq. ft., with over 200 linear feet of extra depth, lab bench-top space available. The MiL, Inc.'s main facility includes a dedicated general microbiology laboratory, media kitchen, instrument, and environmental, food, and pharmaceutical microbiology laboratories. At the MiL, Inc., our national base of industrial clients are accustomed to very competitive pricing, quality service, objectivity, convenience, safety, reliable customer support, capacity, leading edge technology, and guaranteed turn-around time. Call our **toll free number (800) 688-9144** for more information. We have built our international reputation on one simple formula: quality service, excellence in microbiology, reliability, and consistently short turn-around times. Understanding these basic needs has allowed us to develop an extensive list of valued customers including national laboratories, Fortune 100 companies, research institutes, university departments, consultants, health providers, and many others.

Analytical Microbiology

Our many services include:

Identification of Bacteria, Yeasts and other Fungi – GC-FAME, Biolog™, Vitek2, 18S rRNA seq. IDs

Custom Strain Tracking and Microbial Monitoring – “Bacterial Bar-Codes” , TEMPO, qPCR
Food, Pharmaceutical and Cosmetic Analyses

Evaluation of Disinfectants, Fungicides, Sanitizers and Algacides

Sterility Testing

Bioburden Measurements

Applied Microbiology

Industrial Hygiene Microbiology

Environmental Microbiology Exposure Analyses

Product Audits, Plant Inspections, Food Safety Tests

Laboratory Design Microbiology

Environmental Bioremediation Biofeasibility Studies

Microbial Research

Types of research projects we have performed, including contract research:

Medical Device Contamination/Decontamination Studies

Small Business Innovative Research Grant Work

Fermentation Studies

Microbial Product Production and Strain Selection

Odor Control

Waste Treatment

Healthcare New Product Development Studies

Industrial and Food Product Device Development

Biotreatment and Degradation

Leading Edge Microbial Monitoring Research

Diagnostic Test Development Research

-Total Quality Commitment -

Microbe Inotech Laboratories strives for continuous quality improvements in all aspects of our laboratory operations. Our clients from a variety of industries know of the critical importance that all of their products adhere to the highest possible standards of quality, safety, and consistency. Microbe Inotech Laboratories can be your partner in the quest to maintain contaminant free and consistent products. With our years of analytical experience and rigorous quality assurance and quality control programs, we can assure the integrity of our results. The MiL's lab analyses provide our clients with scientifically valid, accurate, reliable, and regulatory compliant analyses documented in compliance with all applicable regulations and standards. The following is a summary of the critical elements of our Quality Assurance Program:

Accepted Methods

Our experience staff analyses samples in accordance with official published methods, validated in-house methods, or client specified methods. We use methods that provide verifiable results and are accepted by organizations such as: AOAC, AOC, ASTM, BAM, AACC, USP, BP, EP, CTFA, USDA, Standard Methods for the Microbiological Examination of Foods, and Standard Methods for the Examination of Dairy Products. We assist our clients in custom method development and validation for specific products. All custom methods and analytical results are considered confidential.

Standard Operating Procedures

The formal structure of our Quality Assurance Program is described in a set of corporate Standard Operating Procedures (SOPs). As a critical part of our Total Quality Commitment and Good Laboratory Practices (GLP), we have an ever increasing array of detailed SOPs. Our lab analyses have written and validated procedures that are controlled and current. All laboratory personnel have been properly trained to implement our SOPs. Laboratory instrumentation are qualified, calibrated, and maintained in accordance with written SOPs.

Traceable Data and Control

All of our lab data is recorded and reported so that it is traceable to the date specific instruments used, and name of the lab analyst who performed the test. Each analytical method that was followed to perform the test is reported. Two lab scientists sign every report to assure that the data and tests have been reviewed for accuracy, completeness, and compliance with established methods and standards. All reagents and standards utilized in the test are reported. To assure accountability of results, each sample is assigned a unique identification number that is referenced in all applicable documentation. We use analysis of procedural blanks, duplicates, spiked and blind samples, standards, positive and negative controls, and calibration check samples on a routine basis.

Data Review

Microbe Inotech has an extensive and systematic review procedure of all laboratory data and reports. The raw data is initially reviewed between the analyst and the lab supervisor. The final data set and client report is then reviewed for completeness and accuracy, and is approved by both the Laboratory Manager and a Ph.D. level scientist. The dual signature and review process assures error free results and reporting. All raw data and report copies are retained for a period of five years in a secured area managed by designated archivists.

Quality of Our Professional Staff

Quality programs are only as good as the people implementing them. Our lab professionals are degreed microbiologists and biochemists with extensive industrial microbiology and chemistry experience. Work history and training files are maintained for each employee to document that lab staff members have the proper background to perform their responsibilities. Every member of our professional staff has the capability to directly interact with our clients. Our direct and personal approach to customer service provides fast and accurate solution to our client's requests. On going training in the latest scientific methods, GLP, and total quality concepts enables us to remain current and to remain on the path of continuous process improvement.

- Consulting Services -

Microbe Inotech Laboratories' senior scientists have over 100 combined years of international experience applying Microbiology, Biochemistry, Food Safety & Nutrition, as well as, Parasitology to successful environmental & health problem solving. We offer the MiL's expertise on a consult basis to management, researchers, manufacturers, governmental entities, and industrial customers faced with solving the most challenging environmental microbiological, chemical, and food safety problems.

Microbiology/Biochemistry
Bruce C. Hemming, Ph.D.

Food Safety & Nutrition
Sandi B. Hemming, RDN,LD.

Parasitology
Michael M. Ndengele, Ph.D.

SERVICES

Treatment Simulations
Conceptual Remedial Design
Implementation Assistance
Trace Element Mixes
Enhanced Bioremediation
Biotreatment Operations
Odor Control
New Technology Evaluation
Bioremediation Program Management
Heavy Metal Biotransformation
Regulatory Expertise
Technical Training

Contaminant Parasitology
Expert Witness
Environmental Audits
Environmental Compliance
Patent Documentation
Product Development
Food Safety Assays
Program Management
Quality Assurance
Quality Control
Seminar Design/Presentation
Food Nutritional Analysis



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email: info@microbeinotech.com or
bhemming@microbeinotech.com

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- Management Approach and Key Personnel Resumes -

Microbe Inotech Laboratories has the scientific and management personnel, quality control focus, standard operating procedures, and the computerized lab/accounting systems necessary to manage all financial and technical aspects of concurrent projects. The MiL, Inc. uses integrated accounting and lab management software which allows both out financial and technical personnel to track samples, maintain chains of custody, and monitor costs for each product against both the budgeted and projected final costs. Reporting can be specified to include specific client activity, invoice, and purchase order reporting, as well as budget versus actual cost tracking. A detailed electronic audit trail can be easily generated in report format for all transactions on a single or specified group of projects and/or clients.

A brief professional background synopsis cover page and complete resumes are included for each of our key scientists and business management personnel:

- Bruce C. Hemming, Ph.D. – President/CEO
- Sandi B. Hemming, RDN, LD – Director Food Safety & Nutrition
- Michael M. Ndengele, Ph.D. – Parasitology & Operations Director, Microbe Scan LLC.
- Ms. Sarah Blamey, BA. – Director Helix Center Core Laboratory
- Mr. Robert J. Hoffmann, BA – Office & IT Manager, Marketing & Sales
- Ms. Michele Gossett, BA., MPA. – Laboratory & Intern Program Manager
- Mr. Ben Winkler, (MS, 2014 candidate) – Research Laboratory Manager

Contact Information:

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St. Louis, MO 63146

Website: www.microbeinotech.com

Email: info@microbeinotech.com Phone: (800) 688-9144

- Bruce Hemming, Ph.D. Corporate Development (314) 645-2177 ext. 100 or (cell: 208-520-4342)
- Rob Hoffmann – Office Manager & Accounting: (314) 645-2177 ext. 111 or (800) 688-9144
- Ben Winkler – Project Coordinator: (314) 645-2177 ext. 104
- Michele Gossett – Lab Manager (314) 645-2177 ext. 107

Helix Center Core Laboratory (a satellite laboratory wholly owned and operated by the MiL inc.)
1100 Corporate Square Dr., Room 225
Creve Coeur, MO 63132

Website: www.helixcenterlab.com

Email: sblamey@helixcenterlab.com

- Sara Blamey – Laboratory Manager: (314) 645-2177 ext. 103

Microbe Scan, LLC. [Founding Partners: Drs.: Hemming, Marshall & Ndengele]
1100 Corporate Square Dr., Room 224
Creve Coeur, MO 63132

- Michael M. Ndengele, Ph.D. COO – (314) 645-2177 ext. 108

- Laboratory Management Staff -

Bruce C. Hemming, Ph.D.

President & CEO, Executive Director of the Helix Center Core Lab, Partner & CEO (Microbe Scan, LLC)

Dr. Hemming is an accomplished science and business professional with over 30 years of real-world experience in microbiology and its practical application relating to product quality. In 1982, he received his doctorate in Plant Pathology from Montana State University, Bozeman. As an educator, he served as an adjunct professor at St. Louis University as well as the University of Missouri, St. Louis and as a visiting faculty member for the Institute of Genetics Education at the University of Wisconsin. During his ten years at Monsanto Corporation, Dr. Hemming was responsible for multi-disciplinary teams involved in original research in the agricultural food production areas of microbiology and plant pathology. He has earned several awards related to his work and research, which has included being selected as a Ralph M. Johnson distinguished guest lecturer and has presented his work in Austria, England, France, Germany, Israel, Japan, Yugoslavia and many US universities. He is the author or co-author of more than forty peer-reviewed scientific journals and industrial publications including a textbook on iron nutrition in plants and microorganisms published by Academic Press.

Sandi B. Hemming, RDN, LD.

(Registered & Licensed Dietitian)

Director of Food Safety & Nutrition

Mrs. Hemming is an experienced food and nutrition professional with many years of clinical experience. She has also applied her skills in the food service and community arenas. As an educator, she served as an adjunct professor at Idaho State University as well as BYU-I. She has also taught within the healthcare world, developing inservice programs for healthcare workers including food safety training. She has participated in program development, community health promotion, served as a media spokesperson and has consulted in a variety of industries and government programs for various demographics groups including the restaurant industry, day care, hospice, home health, early childhood education and geriatrics. She is certified in weight management for adults levels I and II and has shown a commitment to health promotion through a variety of professional and volunteer affiliations. She has a keen interest in the provision of an optimal diet that is safe and available to all.

Michael M. Ndengele, Ph.D.

Parasitologist & Chief Operations Officer (Microbe Scan, LLC.)

Dr. Michael Ndengele, Parasitologist & COO of Microbe Scan, LLC, raised in Kenya, completed his undergraduate degree in Biological Sciences at the University of Nairobi. A US citizen, Dr. Ndengele has worked in St. Louis for 16 years in academic and small technology enterprises. He has served as a Senior Research Scientist at Confluence Life Sciences, Apse LLC, and Metaphore Pharmaceuticals. Michael served as a Health Research Scientist for the Department of Veterans Affairs in St. Louis (2007-2011) and at the Saint Louis University School of Medicine (2005-2007), where he previously was Postdoctoral Research Fellow (1996-2000). His Ph.D. was from Cleveland State University. Working at Microbe Inotech Laboratories Inc. as a Microbiologist/Parasitologist, he is also a partner with Dr. Hemming in Microbe Scan, LLC., an entrepreneurial startup company dedicated to developing a new technology for microbial population determinations, with an interest in rural agricultural and 3rd World water applications.

Other Key Staff Members:

Sara Blamey, BA – *Director Helix Center Core Laboratory*

Robert J. Hoffmann, BA – *Marketing & Sales/ Office Manager*

Michele Gossett, BA, MPA – *Laboratory & Intern Manager*

Ben Winkler, MS (candidate) – *Research Lab Manager*



BRUCE CLARK HEMMING, PH.D.

**PRESIDENT AND CHIEF EXECUTIVE OFFICER
MICROBE INOTECH LABORATORIES, INC.**

and

**Executive Director of the Helix Center Core
Laboratory,**

A satellite lab operated by the MiL inc. in the
Pre-Seed Biotechnology Business Incubator owned by the
St. Louis Economic Development Partnership serving the City
and County of St. Louis

also a

Founding Partner & CEO of Microbe Scan, LLC.

Summary of Business and Science Qualifications:

Founder and President of an independent life sciences service laboratory & consultant group: Microbe Inotech Laboratories, Inc. (The MiL, Inc.), 1991 to present. A primary service function of The MiL, Inc. is to provide rapid characterization of microbial isolates (primarily bacterial and yeast and other fungal profiles for identification purposes) and assistance in microbiology, bioinorganic chemistry, technology evaluation, food safety and regulatory assistance. The MiL, Inc. also consults on microbial projects of numerous types wherein expertise in microbial identification, bacterial genetics, environmental assays, industrial manufacturing bioprocesses and regulatory issues are significant. The MiL, Inc. serves in the facilitation of documentation, enumeration, and exchange of microbial information in the areas of the microbial sciences through implementation of innovative multimedia data presentations and communications.

Employment (Previous Positions):

March 1, 1982-December 31, 1990 (ca.9 years in various positions within Monsanto Co.)
Senior Research Specialist / Biocontrol Project Leader
Crop Protection, Technology Division, Monsanto Agricultural Company, a unit of
Monsanto Co., St. Louis, MO

Primary Responsibilities: Development of creative exploratory research within crop protection technology with a focus on biological control and microbial genetics. Served as Biocontrol Project Leader in the development of biofungicides in conjunction with CSIRO Division of Soils (Australia) and State Universities in the U.S. Project coordinator of a multi-disciplinary research team working toward the development of biofungicides. Project coordination included all aspects involved in the development and

execution of team goals. This responsibility included the development of collaborative agreements, preparation of regulatory documents, microbial physiology and tracking studies, coordination of the natural product/gene discovery effort, and field trials of the project. Created the initial establishment of extra-mural research agreements at the scientific/technology/ legal interface and acted as science liaison on public relations issues relating to environmental introductions of genetically manipulated organisms with PR dept. Provided and submitted regulatory packages for small-scale field tests of genetically engineered strains to Federal and State Regulatory Agencies. Provided expertise in science of bacterial plant pathogens and the isolation, characterization and identification of small molecule natural products and microorganisms. Implemented new technology in laboratory automation. Served as a core team member on bioinsecticide, bioherbicide and computer technology project teams.

November 1, 1989 – December 31, 1990

Biocontrol Project Leader

Crop Protection, Technology Division, Monsanto Agricultural Company,
a unit of Monsanto Co., St. Louis, MO

January 1, 1989 - November 1, 1989

Senior Research Biologist, Plant Biology and Microbial Genetics Group,
Molecular Biology Program, Monsanto Corporate Research Laboratories, St.
Louis, MO

February 1, 1984 - January 1, 1989

Research Specialist, Biocontrol, Crop Protection, Technology Division,
Monsanto Agricultural Company, St. Louis, MO

March 1, 1982 - February 1, 1984

Research Specialist, Plant Microbiology, Plant Molecular Biology Group,
Biological Sciences Division, Monsanto Corporate Research Laboratories,
St. Louis, MO

University Appointments:

Advisory Board Member to the Dean of the College of Arts and Sciences, Webster University, St. Louis, Daniel Webster Fellowship Association, July, 2013.

Adjunct Professor, Department of Biology, University of Missouri, St. Louis, MO teaching a graduate course in molecular genetics of bacteria, Fall Semester, 2007

Adjunct Associate Professor, Department of Biology, University of Missouri, St. Louis, MO teaching a graduate course in phytobacteriology 1985 and microbial genetics 1998.

Adjunct Professor, Department of Biology, St. Louis University, St. Louis, MO teaching a general microbiology course to majors. Winter Semester, 1992

Visiting faculty member for the Institute for Genetics Education, University of Wisconsin, Madison, WI. Presented "Engineered Microbes for Agricultural Use," June-July session, 1987.

Education:

Ph.D., 1982, Department of Plant Pathology, Montana State University, Bozeman, MT; Dissertation: Plant-Associated Fluorescent Pseudomonads: Their Systematic Analysis, Microbial Antagonism and Iron Interactions, University Microfilms, Ann Arbor, MI

M.S., 1977, Graduate Section of Biochemistry, Brigham Young University, Provo, UT; Masters thesis: High Pressure Liquid Chromatographic Methods for the Separation of Derivatized alpha-Keto Acids and Thiamine Phosphate Esters

Graduate Studies: 1976-1977, Department of Biochemistry, University of California, Riverside, CA; Bone tissue & cell culture, lymphokine isolations

B.S., 1974, cum laude with a microbiology major and chemistry minor, Brigham Young University, Provo, UT

Language Proficiencies:

German - (written and oral): This language was used extensively for 24 months (1970—1972) in Austria. Subsequent training has included a culture and history course conducted in German for 4th year university language students. Upon return from Austria, 16 semester hours of German language was obtained by special examination (equivalent to 3 years of university language training in both conversation and writing).

Membership in Professional Organizations: (Corporate Memberships in AOAC, ASTM, ACIL, and MOBio. Contact B. Hemming for current year registrations)

- American Association for the Advancement of Science (AAAS)
- American Chemical Society (ACS)
- American Council of Independent Laboratories (ACIL)
- American Society for Microbiology (ASM)
- American Society for Testing Materials (ASTM –subcommittee 34.5)
- American Phytopathological Society (APS)
- National Registry of Environmental Professionals, REP No. 5341
- National Association of Environmental Professionals, No. 06764
- Society of Industrial Microbiologists (SIM)
- Society of Tribologists and Lubricant Engineers (STLE)

Scholarships, Honors and Other Recognitions:

- Non Partisan Gubernatorial Appointment, BioDefence SubCommittee, State of Missouri. 2002.
- Ralph M. Johnson Distinguished Guest Lecturer, College of Science, Utah State Univ., Logan, Utah, Five lectures, July 24—28, 1989.
- Monsanto Crop Protection Rapid Recognition Award—Regulatory Affairs, 1990.

- Monsanto Plant Molecular Biology Awards: Plant Microbiology Group 1987, Personal Creativity 1988.
- Sigma Xi, Monsanto Chapter (Research Society, October 1, 1983)
- Aerojet Nuclear Corporation, Four year Undergraduate Scholarship (1969)
- John Einar Anderson Scholarship in Chemistry, BYU, 1975—1976

Other Training and Experience:

- Waters Associates - HPLC technique training, San Francisco, CA 1979
- Practical Management Skills (3 semester hrs.) St. Louis University—Monsanto, 1983
- Managerial Transactional Analysis—Monsanto, 1984
- Uncovering Natural Communication Skills—Monsanto, 1985
- Situational Leadership Course—Monsanto, 1986
- Effective Presentation Skills Course—Communispond Trainer Development Institute, 1987
- Teamworth™ Team Leadership Skills—TERCON Management Systems Inc., 1990
- US FCC Amateur Radio Operator – Technicians License – Call Sign: KC0VIF, 2005
- SkyWarn Level 1 & 2 Severe Weather Observation Course, 2006
- Radio Amateur Civil Emergency Service WC0AAF/W0AAF R.A.C.E.S. No. 249, 2006
- Community Emergency Response Team (CERT) Training, 2006

Patents & Applications:

B. C. Hemming and D. J. Drahos - inventors. Marker Genes in Pseudomonad Bacteria. U.S. Patent No. 4,753,876. Assignee: Monsanto Co., St. Louis, MO. Filed: Mar. 21, 1984, Issued: June 28, 1988. 24 pp., 5 Figures, 11 claims.

E. G. Jaworski, B. C. Hemming, S. A. McPherson, D. J. Drahos, E. C. Lawson, C. B. Jonsson, and R. L. Fuchs. Nematode Control Using Genetically Transformed Microorganisms. 64 pp. European Patent No. EP-171381 and U.S. – 636888

J. J. Orolin, J. G. Frycek, and B.C. Hemming. Compositions and Method for Bioremediation of Halogen Contaminated Soils. U.S. Serial No. 08/383,790

Awarded Research Grants: (Principal Investigator—The MiL, Inc.)

USDA-SBIR Phase I. Very Rapid Pathogen Detection Using Stable Bacteriophage. 6-month term, 7/1996-12/1996. \$60,000.

USDA-SBIR Phase II. Practical Detection of Food-borne Pathogens Using Biochemically Stable Bacteriophage. Proposal No. 9703389, Grant No. 96-33610-2376. 9/1/97-8/31/00 \$250,000.

Professional Activities:

Invited Participant in The Keystone Center Biotechnology & TSCA Workshop for the EPA, Washington, D.C., June 8-9, 1993. [Discussions on Bioremediation, Biosensors, & Biomaterials].

Founding Editorial Board Member for the journal “Biology of Metals”, Springer-Verlag Publishers. Gunter Winkelmann, Editor-in-Chief, Term: 1988—1991.

National Science Foundation (NSF), Prokaryotic Genetics Program Review Panel Member (microbial prokaryotic & eukaryotic genetics—served several sessions).

Member of Subcommittee on Microbes of the National Genetic Resources Program, USDA Mar.1991—present.

USDA Biological Control Working Committee, Monsanto Representative Washington, D.C. (R. James Cook, Chairman) April, 1990.

Chairman of the Executive Committee (1988) of the NC-135. A Federally-sponsored Regional Committee on Phytobacterial Research having served as secretary and vice-chairman. Committee member since 1983. This committee terminated after 10 years on Sept. 30, 1990 and was reinstated as NCR-169 “Detection, Ecology, & Management of Pathogenic and Beneficial Bacteria Associated with Plants”. 1986—1989.

National Research Council Briefing Panel Member on Biocontrol, February 11—13, 1987, Washington, D.C., Feb. 1987—June 1987.

Member of the Bacteriology Committee of the American Phytopathological Society, 1983-1986. Member of USDA–ESCAP Subcommittee for Biological Control of Pests and Disease. Pre–Symposium Meeting (Apr., 1988, Stowe, Vermont) and the 1989 UCLA Symposium entitled “New Directions in Biological Control”, Frisco, CO., Nov. 1987–1989.

Invited participant in the Ciba Foundation Discussion Meeting following the Royal Society Discussion Meetings on Biocontrol, February 18–20, 1987, London, England.

Invited Participant in the National Biological Impact Assessment Program Database Meeting, June 27–28, 1988 to assist in database guideline development for this program of the USDA—CSRS.

Committee member representing bacterial systematics in assessment of the feasibility of developing a computerized national network among scientists who maintain collections of living microbial and subcellular entities associated with plants under USDA/CSRS sponsorship. National Microbial Collections Computer Network Workshop (Minneapolis, MN, Oct. 27–29, 1986) Now known as the Microbial Germplasm Database (MGB), 1986—1991.

Participant in the NC–172 Committee on the Incidence, Biology and Management of the Pine Wilt Nematode Complex. Hosted 14 nematologists at the Monsanto Life Sciences Research Center, March 25– 26, 1986.

Ad hoc reviewer for manuscripts submitted to *J. Bacteriology*, *Trends in Bio., Plant Physiology* and for proposals submitted to the Competitive Research Grants Office (Biological Stress Program) USDA/S&E/CSRS/OGPS, the Montana Technical Alliance and also the U.S.—Israeli Binational Agricultural Research and Development Fund (BARD).

Review team member for USDA sponsored site-visit for Biosciences Facility Feasibility Study at Montana State University, Bozeman, MT, March 8–10, 1989.

Director appointee (Crop Protection) to the Monsanto Agricultural Co. Technology Division Technical Excellence Award Selection Committee, 1990–91.

Biotechnology Advisory Council member for the College of Arts and Sciences, University of Missouri-St. Louis, 1992—present.

St. Louis Community College Biotechnology Advisory Board Member, 1999—present.

Dr. Bruce C. Hemming (Sub-Committee Chair-US), Dr. Alexandra Fluri (Swiss) and Dr. Caroline Duchaine (Quebec, Canada). Report to ASTM Committee 34.50 on Mini-Round Robin Assays on the qPCR Detection and Enumeration of *Mycobacterium immunogenum* in Metal-Working Fluids. Annual STLE Meeting (Society of Tribologist and Lubricant Engineers), Cleveland, OH May, 2008.

Publications:

Twenty-six scientific journal and text articles, seven regulatory (multi-volume) documents and 10 confidential industrial publications, co-editor of the text “Iron Chelation in Plants and Microorganisms” Academic Press 1993.

Refereed Papers:

C. J. Gubler and B. C. Hemming. “High Pressure Liquid Chromatography of Thiamine, Thiamine Analogs and their Phosphate Esters,” *In Methods in Enzymology*. Vol. 62-D, 63-68, 1979, McCormick and Wright, Volume Eds., Sidney P. Colowick and Nathan O. Kaplan, Editors-in-chief, Academic Press, Inc.

B. C. Hemming and C. J. Gubler. “High Pressure Liquid Chromatography of alpha - Keto Acid 2,4-Dinitrophenylhydrazones,” *Anal. Biochem.* 92 (1), 31-40, 1979.

B. C. Hemming and C. J. Gubler. “Separation of Thiamine, Thiamine Antagonists and their Phosphate Esters by High-Performance Liquid Chromatography,” *J. Liquid Chromatogr.* 3 (11). 1697-1712, 1980.

Samuel S. Kent and Bruce C. Hemming. “High Performance Liquid Chromatographic Separation of 3H-3-Phosphoglyceric Acid and 14C-Phospho-glycolate,” *J. Chromatography.* 177 (2), 372-375, 1979.

Bruce C. Hemming, Cindy Orser, Darrel L. Jacobs, David C. Sands and Gary A. Strobel. “The Effects of Iron on Microbial Antagonism by Fluorescent Pseudomonads,” Proceedings of the First International Symposium on “Iron Nutrition and Interactions in Plants,” held August 12-14, 1981, Provo, UT. *J. of Plant Nutrition.* 5 (4-7), 683-702, 1982.

Bruce C. Hemming and Gary A. Strobel. "Bacterial Disease and the Iron Status of Plants," Proceedings of the First International Symposium on Genetic Specificity of Mineral Nutrition of Plants, held August 30- September 4, 1982, Belgrade, Yugoslavia, In *Genetic Aspects of Plant Nutrition*, pp. 347-358, M. R. Saric and B. C. Loughman (editor), Martinus Nijhoff Publisher, 1983. ISBN 90-247-2822-3.

Bruce C. Hemming. "Microbial-iron Interactions in the Plant Rhizosphere, An Overview," Proceedings of the Third International Symposium on "Iron Nutrition and Interactions in Plants," held June 24-29, 1985, Lincoln, NE. *J. of Plant Nutrition*. 9 (2-5), 505-521, 1986.

E. C. Lawson, C. B. Jonsson and B. C. Hemming. "Genotypic Diversity of Fluorescent Pseudomonads as Revealed by Southern Hybridization Analysis with Siderophore-Related Gene Probes." Proceedings of the NATO Advanced Study Workshop on "Iron, Siderophores and Plant Disease," held July 1-5, 1985, European Centre for Agricultural Studies, Wye College, Kent, England, In *Iron, Siderophores and Plant Disease*, R. T. Swinburne (Editor), Plenum Publishing Corp. NY, pp. 315-330, 1986. ISBN 0-306-42407-X.

David J. Drahos, Bruce C. Hemming and Sylvia McPherson. "Tracking Recombinant Organisms in the Environment: β -Galactosidase as a Selectable Non-antibiotic Marker for Fluorescent Pseudomonads." *Bio/Technology* 4, 439-444, 1986.

D. J. Drahos, G. F. Barry, B. C. Hemming, E. J. Brandt, H. D. Skipper, E. L. Kline, D. A. Kluepfel, T.A. Hughes and D.T. Gooden. "Pre-release Testing Procedures: U. S. Field Test of a *lacZY* - engineered Soil Bacterium", In *Release of Genetically-Engineered Micro-organisms*. M. Sussman, C.H. Collins, F. A. Skinner and D. E. Stewart-Tall (editors), Academic Press, London, pp. 181-191, 1988. ISBN 0-12-677521-4.

Sechan Wee, J. B. Neilands, M. L. Bittner, B. C. Hemming, B. L. Haymore and R. Seetharam. "Expression, Isolation and Properties of FUR (Ferric Uptake Regulation) Protein of *Escherichia coli* K-12" *Biology of Metals* 1 (1), 62-68, 1988.

D.J. Drahos, G.F. Barry, B.C. Hemming, E.J. Brandt, E.L. Kline, H.D. Skipper, and D.A. Kluepfel. "Spread and Survival of a Genetically Marked Bacterium in Soil", In *Environmental Release of Genetically Engineered and Other Microorganisms*. M.J. Day and J.C. Fry (editors), Academic Press, London, 1990.

Xinhua Ji, Dick van der Helm, Bruce C. Hemming and Barry L. Haymore. Structure and Intramolecular Hydrogen Bond of 1-Phenazinecarboxylic Acid. *Acta Cryst.* 48C, 109-111, 1992.

Larry L. Barton and Bruce C. Hemming (Editors). *Iron Chelation in Plants and Soil Microorganisms* Academic Press, Inc. N.Y., 22 Chapters. 1993. ISBN 0-12-079870-0.

B.C. Hemming and John M. Houghton. Chapter 2: Impact of Biotechnology on Biocontrol of Soil-Borne Plant Pathogens. In *Application of Biotechnology to Plant Pathogen Control.*, Ilan Chet (Editor), Wiley-Liss, Division of Wiley Publishers, N.Y. 1993. ISBN 0-471-56084-7.

Non-refereed Papers:

B. Hemming. Photo-credit for Electron Micrograph of *Pseudomonas syringae* In “Dutch Elm Disease,” by Gary A. Strobel and Gerald N. Lanier, *Scientific American* 245 (2), 40-50, August, 1981.

Coauthor-panelist for the National Research Council *Research Briefings 1987 Report of the Research Briefing Panel on Biological Control in Managed Ecosystems for the Office of Science and Technology Policy, the National Science Foundation, and Selected Federal Departments and Agencies*, 12 pp., *National Academy Press*, June, 1987.

Bruce C. Hemming. “Professor John B. Neilands. The Iron-Clad Baron of Bioinorganic Transport and Regulation.” Proceedings of the 4th International Symposium on Iron Interaction in Plants, Albuquerque, NM, July, 1987. *J. of Plant Nutrition*, 11 (6-11), 1585-1588, 1988.

G. F. Barry, M. Vincent, M. Weldon and B. C. Hemming. “Application of Genetic Engineering and Molecular Probes to Soil Bacteria as an Aid to Monitoring in the Environment,” Proceedings of REGEM 1, St. David's Hall, Cardiff, Wales, UK., April, 1988. —see Barry under discussion session “Construction of Reporter Strains” In *Release of Genetically-Engineered Micro-organisms*. M. Sussman, CH. Collins, F. A. Skinner and D. E. Stewart-Tall (editors), Academic Press, London, pp. 211-219, 1988. ISBN 0-12-677521-4.

Bruce C. Hemming. “Monitoring and Identification of Bacteria from Agricultural Environments by Gas-Chromatography Fatty Acid Methyl Ester (GC-FAME) Analysis” In *Bioinstrumentation*, a special textbook in honor of the 50th Anniversary of the National Association of Biology Teachers (NABT). C.T. Lange (editor), pp. 57-70 Mathematics and Science Education Center (MSEC), Univ. of Missouri-St. Louis, 1988.

Bruce C. Hemming. “Bacteria as Antagonists in Biological Control of Plant Pathogens”, In *New Directions in Biological Control: Alternatives for Suppressing Agricultural Pests and Diseases*, UCLA Symposia on Molecular and Cellular Biology, New Series, Volume 112, Editors, R. Baker & P. Dunn, Alan R. Liss Inc., New York, NY, (1989), pp. 223-242.

C. Y. Kawanishi and B.C. Hemming. “Discussion Summary: Application of Biotechnology to the Systematics and Monitoring of Biocontrol Agents”, In *New Directions in Biological Control: Alternatives for Suppressing Agricultural Pests and Diseases*, UCLA Symposia on Molecular and Cellular Biology, New Series, Volume 112, Editors, R. Baker & P. Dunn, Alan R. Liss Inc., New York, NY, (1989), pp. 649-652.

R. James Cook, David M. Weller, David J. Drahos, Peter A. Kovacevich, Bruce C. Hemming and Elizabeth L. Pierson. “Establishment, Monitoring, and Termination of Field Tests with Genetically Altered Bacteria Applied to Wheat for Biological Control of Take-all.” Proceedings of the International Symposium on the Biosafety Results of Field Tests of Genetically Modified Plants and Microorganisms. Kiawah Island, South

Carolina, Nov. 27-30, 1990. In *Biological Monitoring of Genetically Engineered Plants and Microbes*, D.R. MacKenzie and S.C. Henry, eds., Agricultural Research Institute, Bethesda, MD, (1991), pp. 177-187.

J.K. Milke, B.C. Hemming, T. McCay-Buis, D.M. Huber, F. Lytle. "Characterization of Hydrocarbon Degrading Bacteria Using a Multi-well Plate Format", In: *Proceedings of the American Chemical Society*, Atlanta, GA. Sept. 28-30, 1993.

D.M. Huber, T.S. McCay-Buis, K.J. Miller, F.E. Lytle, J.P. Robinson and B.C. Hemming. "Automation Of Aminopeptidase Profiles In 96-Well Plates", In: *Proceedings of the American Phytopathological Society*, Nashville, TN, Nov. 6-10, 1993.

B.C. Hemming. Chapter 3. Molecular Biology of Biological Control of Bacterial Diseases. In: *Molecular Biology of Biological Control of Pests and Diseases of Plants*, D. J. Weber and M. Gunasekaran, editors. CRC Press, 1994.

Gernon, Michael D. and Bruce C Hemming, Mysteries of Mycobacteria; Research Delves into Metalworking Fluid Risks. *Lubes 'N' Greases*, 9 (2003), 12, 14-20

Gernon, Michael D. and Bruce C. Hemming, Modern Tools, Ancient Art – How to Craft Metalworking Fluids with Biosynergy. *Lubes'N'Greases*, 11 (2005), 5, 1/-24.

Regulatory & Industrial Publications (other documents):

Data submission (co-author) for "Application for Field Release of a Live Genetically Engineered Strain of *Pseudomonas* for the Purpose of Testing a Microbial Tracking System"—A Proposal by CSIRO Division of Soils with author and submitter, Dr. M. H. Ryder. 1 Volume (26 pp., 7 appendices) submitted to the Secretary of the Genetic Manipulation Advisory Committee (GMAC), Canberra, Australia in April, 1990. **Field Test Approval given June 18, 1990 for this test initiated on October 12th, 1990 in South Australia.**

Dr. Bruce C. Hemming and Dr. E. J. Brandt (authors & submitters): "Small-scale Field Testing of *lacZY* (*E. Coli* K-12) Engineered Microbial Fungicides, *Ps.* Q2-87AL6 and *Ps.* QC-65AL7: Evaluation for Efficacy as Biological Control Agents Against Take-All (Ggt) Disease of Wheat"--A Collaborative Study by Monsanto Co., Washington State University (USDA/ARS), Purdue University, and Montana State University.

1 Volume (105 pp. 7 attachments) submitted to the EPA – Office of Pesticide Programs, Washington, D.C., on March 6, 1990. Field Test Approval given May 1, 1990. Tests initiated May 7, 1990 for a multi-seasonal, multi-strain, multi-site test regime. EPA-OPP Designation No. 524-NMP011.

Co-author of the "Biotechnology Premanufacturing Notification Proposal for Field Testing of Host *Pseudomonas fluorescens* (*Ps.* 3732RN) and Genetically Engineered *Pseudomonas fluorescens* (*Ps.* 3732RNL11) -- A Collaborative Study by Monsanto Company and Clemson University." 2 Volumes (Vol. I, 163 pp., Vol. II, 18 attachments) submitted to the Document Control Officer, Office of Toxic Substances, TS-793, U.S.

Environmental Protection Agency, Washington, DC. June 18, 1987. Field test initiated Nov. 2, 1987. Final report 17 July, 1989. EPA-OTS PMN Designation No. P-87-1292.

Co-author of a similar document to the preceding one listed “Request for Concurrence by USDA-APHIS on Non-Plant Pest Status of Host and *lacZY*-Marked *Pseudomonas fluorescens* Organisms” was submitted to the USDA-APHIS, Washington, DC, on June 29, 1987. These documents were presented publicly before the EPA’s Biological Science Advisory Committee (BSAC), **August 26, 1978 for the first field test of an engineered organism expressing foreign genes.** This study commenced under the Toxic Substances Control Act (TSCA) regulations on November 2, 1987.

Data submission for “Description of the Microbial Strain” contained in the 3-Volume Field Testing Proposal by the Monsanto Company entitled “Small-Scale Field Testing of a *lacZY* (*E. Coli* K-12) Engineered Microbial Fungicide: Evaluation of Wheat Root Colonization by (*Ps.* 2-79RNL3) and Level of Root Infection by Take-All (Ggt) Disease” submitted to the EPA – Office of Pesticide Programs, Arlington, Virginia on July 20, 1988 by Monsanto Agricultural Company’s Regulatory Compliance Manager, Dr. E. J. Brandt. This test commenced in conjunction with the Soil-Borne Disease Laboratory, USDA-ARS, Washington State University, and Clemson University. This test represents the first test of a recombinant fungicidal bacterium and commenced on Oct. 6, 1988 under the Federal Insecticide Fungicide Rodenticide Act (FIFRA) following a 75-day review. EPA-OPP Designation No. 524-NMP-006.

Comments and questions posed by B. Hemming at the Proceedings of a Royal Society Discussion Meeting held Feb. 18-19, 1987 concerning the topic of “Biological Control of Pathogens with Rhizobacteria” by B. Schippers, *Phil. Trans. R. Soc. London.* B 318, 283-293 (1988) are found In *Biological Control of Pests, Pathogens and Weeds: Developments and Prospects*, R. K. S. Wood, F.R.S. and M. J. Way (editors), pp. 291 - 293, published by The Royal Society, 1988. ISBN 0-85403-347-5

B.C. Hemming, K.D. Hughes, F.E. Lytle, T.S. Roseman and D.M. Huber. “Differentiation of Genetically Marked Bacteria with Laser Based Aminopeptidase Profiling”—a paper presented at the *Conference on the Potential of Biotechnology to Minimize Seed-Borne Diseases Threatening World-Wide Germplasm Resources* hosted by Washington State University, Research Extension Center, Puyallup, Washington, Sept. 28 - 1 Oct. 1989.

Internal Monsanto Publications (1983-1990):

The following confidential internal research papers have been authored or co-authored and submitted to Monsanto: MSL2760R (Jan. 1983), MSL3694R (Aug. 1984), MSL4379R (Dec. 1984), MSL4512R (Feb. 1985), MSL4808R (June 1985), MSL5548R (Apr. 1986), MSL6409 (Jan. 1987), MSL7756 (Mar. 1988), MSL8228 (Sept. 1988), MSL10473 (Jun. 1990).

Co-author of a research article in *The Technical Community of Monsanto Newsletter*, 1987.

Invited Seminars and Presentations:

- Department of Plant Pathology, University of Wisconsin, Madison, WI - July, 1982
- Department of Biology, University of Missouri, St. Louis, MO - April, 1984
- Introductory Plenary Address on the Rhizosphere for the 3rd International Symposium, Iron Nutrition and Interaction in Plants, University of Nebraska, Lincoln, NE - June 25 - 27, 1985
- Laboratoire de Biochimie Microbienne, Université Louis Pasteur, Strasbourg, France, July 8, 1985
- Institut für Pflanzenphysiologie der Universität Wien, Vienna, Austria - July 15, 1985
- Sciences, Technology and Society Lecture, Dept. of Chemistry, St. Louis Community College at Forest Park, St. Louis, MO - May 6, 1986
- Department of Botany and Microbiology, University College London, Gower Street, London, U. K. - Feb. 17, 1987
- Department of Plant Pathology, Graduate Students' Selected Seminar Speaker, University of Missouri, Columbia, MO - Mar. 4, 1987
- Plenary Lecturer, 4th International Symposium on Iron Nutrition and Interactions in Plants, Albuquerque, NM. "Role of Microorganisms in the Iron Nutrition of Plants," July 6-9, 1987
- Featured Guest Speaker at the 16th Annual Biology Honor Student Night sponsored by the Dept. of Biology, University of MO, St. Louis - Nov. 19, 1987
- Seminar speaker for the Biotechnology Center, Washington University, St. Louis, MO, jointly sponsored by the Biochemistry & Biology Depts. - Sept. 22, 1987
- Invited Plenary speaker, UCLA Symposium "New Directions in Biological Control," Frisco, CO and Discussion Session Co-leader on "Applications of Biotechnology to the Systematics and Monitoring of Biocontrol Agents," Jan. 20-26, 1989
- Guest and official symposium keynote speaker and editorial board referee for the 5th International Symposium on Iron Nutrition and Interactions in Plants, Dr. Yona Chen, chairman of symposium committee and local arrangements, Hebrew University of Jerusalem, Israel. Keynote topic: "Advances in the Molecular Aspects of Iron Metabolism in Microbes," June 11-18, 1989
- Presentation of 5 lectures as Guest Speaker in the **Ralph M. Johnson Distinguished Guest Lecture Series**, College of Science, Utah State Univ., Logan, Utah July 24-28, 1989
- Special Topic Class offered by the Department of Plant Pathology, University of Wisconsin, Madison, WI entitled: "Molecular Approaches To Studies of Phylogeny, Taxonomy and Population Biology of Plant Pathogenic Microorganisms," Sept. 10, 1990
- Departmental Seminar, Dept. of Plant Pathology, Univ. of Wisconsin, Madison, WI - Sept. 11, 1990
- Plant Biotechnology Seminar Speaker sponsored by the South Carolina Agricultural Experiment Station, Clemson University, South Carolina - Jan. 7, 1991
- Biotechnology In-Service Guest Lecture Seminar Series, St. John's Mercy Hospital Medical Center, Ballas Road, St. Louis, MO Jul. 18, 1991
- B.C. Hemming. Presentation and 2 hour instruction on environmental bacteriological identification methods in the workshop on On-Site Treatment of Contaminated Soils.
- Hazardous Materials Management Conference and Exhibition, 9th Annual Hazmacon®.
- Long Beach, CA - Mar. 30—April 2, 1992
- B.C. Hemming. Presentation and 2 hour instruction on environmental bacteriological identification methods in the workshop on Bioremediation of Soils and Groundwater.

- 10th Annual International Hazardous Materials and Environmental Management
- Conference Atlantic City, NJ - June 10-12, 1992
- Barry L. Haymore, Arthur Wittwer, Bruce C. Hemming. Engineered Switchable
- Enzymes for Selective Microbial Marking and Microbial Population Determination.
- American Chemical Society, Division of Agrochemicals, Special Conference V,
- Natural and Derived Pest Management Agents. Snowbird, UT - August 9-14, 1992
- Invited Seminar Presentation, Argonne National Laboratory, Waste Management
- and Bioengineering Section, Energy Systems Division, Argonne, IL - Sept. 14, 1992
- Invited Seminar Presentation, US EPA Laboratories, Sabine Island, Gulf Breeze, FL
- Sept. 18, 1992
- Invited Seminar Presentation, Hydrobiological Institute, Czechoslovak Academy of
- Sciences, Ceske Budejovice, Czech Republic. Hosted by RN/Dr. Vera Straskrabova
- DrSc, Director - Dec. 4, 1993

Publications (Abstracts—i.e. posters):

B. C. Hemming and C. J. Gubler. "High Pressure Liquid Chromatographic Methods for the Separation of Derivatized alpha-Keto Acids and Thiamine Phosphate Esters," *Fed. Proc.* 37 (6), 1346, 1978.

Bruce C. Hemming, John S. Gardner, Darrell J. Weber and W. M. Hess. "Isoelectric Focusing of Proteins from Dormant Teliospores of *Tilletia caries* and *T. controversa*," Botanical Society of America, Miscellaneous Series No. 156, 77, 1978.

B. C. Hemming, C. Orser, D. L. Jacobs, G. A. Strobel and D.C. Sands. "The Systematic Analysis of Plant-Associated Fluorescent Pseudomonads," *Phytopathology* 72, Abstr.No. 140, p. 947, 1982.

Bruce C. Hemming and David J. Drahos. "β-Galactosidase, A Selectable Non-Antibiotic Marker for Fluorescent Pseudomonads," Proceedings of the 13th Annual UCLA Symposia, Keystone, CO. *Journal of Cellular Biochemistry*, Supplement 8B: 252, 1984.

B. Hemming, D. Drahos, J. Brackin and C. Jonsson. "Characterization of HCN-Producing Soybean Rhizosphere Bacterial Isolates," *Phytopath.* 74 (8), A85, p.800, 1984.

B. C. Hemming, E. C. Lawson and C. B. Jonsson. "Analysis of Siderophore-Related Restriction Fragment Length Polymorphisms Among Fluorescent Pseudomonas Species," *Phytopathology* 75 (11), No. 655, p. 1361, 1985.

E. C. Lawson and B. C. Hemming. "Effect of *Meloidogyne incognita* Infection of Soybean Root Colonization by Recombinant Pseudomonads," Proceedings of the Silver Anniversary of the Society of Nematologists, August 17-22, 1986.

D. A. Gunning and B. C. Hemming. "A Rapid Method of Assessing Root-Knot Nematode Infection Potential," *Phytopathology*, 77 (12), No. 710, p. 1775, 1987.

B. Hemming, D. Drahos, G. Barry and E. J. Brandt (Monsanto Co., St. Louis, MO); H. Skipper, E. Kline, D. Kluepfel, T. Hughes, and D. Gooden (Clemson University, Clemson, SC), "Recombinant Bacteria Expressing Selectable Marker Genes Approved

and Monitored in US A Field Test,” Proceedings of the 5th International Congress of Plant Pathology, Kyoto, Japan, August 20-27, 1988. Abstract No. II 1-16, p. 99.

Larry W. Moore, Bruce C. Hemming and Marcia L. Weldon. “Analysis by GC-FAME of Agrobacteria for Identification of Environmental Native Isolates,” Midwest Crown Gall Conference, St. Louis, MO, Nov. 5-6, 1988.

K.D. Hughes, F.E. Lytle, T.S. Roseman, D.M. Huber and B. C. Hemming. “Differentiation of Genetically Engineered Bacteria with Laser Based Aminopeptidase Profiling”, 1989 Pittsburgh Conference & Exposition, Atlanta, GA, March 6-10, 1989.

Larry W. Moore, Bruce C. Hemming and Marcia L. Weldon. “Analysis of GC-FAME for Identification of Agrobacterium Isolates from Nature”, Proceedings of the 7th International Conference of Plant Pathogenic Bacteria, Budapest, Hungary, June 11-17, 1989.

Instructional Environmental Workshops:

B.C. Hemming. Presentor and instructor [2 hours] on environmental bacteriological identification methods in the workshops on Bioremediation of Soils and Groundwater with Walter Loo, Registered Geologist, C.E.G., Environmental & Technical Services, San Francisco, CA:

- Hazmacon’ 92, Long Beach, CA. - Mar. 30—Apr. 2, 1992
- 10th Annual HazMat/Int’l, Atlantic City, N.J. - June 10-12, 1992
- 2nd Annual HazMat/North-American, Detroit, MI. - Sept. 15-17, 1992
- 8th Annual HazMat/West, Long Beach, CA - Nov. 10-12, 1992
- 6th Annual HazMat/Central, Rosemont, IL - Mar. 9-11, 1993
- HazMat/West-Spring, Long Beach, CA - May 4-5, 1993
- HazMat/Southwest, Dallas, TX - Sept. 28-30, 1993
- 3rd Annual HazMat/North-American, Detroit, MI - Oct. 12-14, 1993



SANDI B. HEMMING, RDN, LD

REGISTERED LICENSED DIETICIAN
Director Food Safety & Nutrition
MICROBE INOTECH LABORATORIES, INC.

Summary of Qualifications:

Dietetics

- Ten years experience as a Clinical Dietitian with emphasis in out-patient counseling and education.
- Developed bariatric program and counseled surgical weight loss patients. Facilitated support group nutrition segments including cooking demonstrations and grocery store tours. Developed format for and wrote monthly segments for bariatric newsletter and blog including “Recipe of the Month” column.
- Organized community health promotion events for Regional Medical Center including annual Heart Fair healthy eating presentations and cooking demonstrations.
- Supervised diet office employees; prepared and presented in-service training for dietary and nursing staff.
- Developed curriculum and taught cardiac rehab nutrition segments to patients and family members.
- Wrote creative teaching modules for weight loss program as a Diabetes Educator in a Physician’s office.
- Developed Teton Peaks Healthy Eating plan for adolescent behavioral health unit; wrote three week cycle menu and facilitated cooking experiences to reinforce key nutrition concepts.
- Served as Nutrition Media Spokesperson for Regional Medical Center including television and radio spots as well as newspaper interviews.

Education

- Six years as adjunct faculty member (Clinical Dietetics Internship Preceptor) for Idaho State University Health and Nutrition Sciences Department.
- Taught Therapeutic Nutrition for Nursing for seven semesters as adjunct faculty member, Idaho State University Nursing Department.
- Presented occasional guest lectures for Dietetic Internship and other NTD classes.
- Developed and taught Nutrition for Health care Workers course for BYU-I Department of Home and Family Education for one semester.

Consulting

- Food Service Director/Nutrition Director for large day care center. Wrote cycle menu, provided nutrition education to staff and parents. Developed and presented food experiences for the children.

- Provided nutrition assessment and care planning for developmentally delayed adults along with education for their caregivers for case management company.
- Nutrition Consultant for Head Start Program through EISSA, responsible for menu development and adherence with regulations/guidelines, trained staff, approved and standardized recipes and cooking methods, served on Community Health Advisory board.
- Home Health/Hospice Nutrition consultant, performed in-home nutrition assessment and counseling.

Management

Five years management experience including Data Entry Department, Customer Service Department, Publishing and Advertising Department, and Personnel Department. Wrote Policies and Procedures Manual for Corporation.

Computer

Nine years computer experience including management of Computer Department maintaining an extensive database; proficient in Windows, MSWord/Word Perfect, FoxPlus, Excel, Quick Books, Easy Way Medical Office Software, Meditech, Outlook, Remedy MD, MS PowerPoint.

Other

Eleven years of progressively responsible office experience. Set up and maintained computerized payroll program for 150 employees and computerized accounting system for corporation; had full responsibility for accounts receivable, accounts payable, billing and collections; and successfully managed and invested retirement accounts.

Education:

Idaho State University, BS Dietetics, Graduated with High Honors
University Recognition Award from the College of Health Professions
ADA Lena F. Cooper Memorial Scholarship

Ricks College, Associate Degree in Business and Economics, graduated with High Honors, Secretarial Student of the Year, Presidential Scholarship

Idaho Dietetic Student of the Year
CACFP Trained
Idaho Obesity Summit Participant



Michael M. Ndengele, Ph.D.

Parasitologist, and COO of Microbe Scan, LLC, an affiliated partnership company to MICROBE INOTECH LABORATORIES, INC.

SUMMARY OF QUALIFICATIONS

PARASITOLOGIST, BIOCHEMIST AND CELL BIOLOGIST: with both industry and academia experience as well as educational background on Plant and insect biology. Proficient and fluent in English as well as in scientific writing and presentation. Productive member of research team with experience in managing research projects including:

- Designing and performing experiments in fields of malaria, immunology and inflammatory diseases
- Performing biochemical and immunological analyses of mediators of pain and inflammation
- Utilizing *in vitro* and *in vivo* models to study malaria pathology
- Utilizing *in vitro* cell system to study the mechanism and mediators of inflammatory responses and diseases
- Utilizing *in vivo* rodent model of pain to study inflammation and mechanisms of pain
- Studying effect of novel drugs on preventing morphine tolerance in mouse model
- Growing and maintaining cell cultures
- Preparing experimental protocols and procedures

TECHNICAL SKILLS

- *In vitro* and *in vivo* maintenance of malaria and cell cultures
- *In vivo* inflammation and pain assays in rodents
- Pharmacokinetics of novel drugs in rodents
- Protein isolation and purification
- Electrophoresis
- ELISAs
- Western blot analysis and immunoprecipitation
- Immunohistochemistry
- Immunofluorescence
- Flow immunochemistry
- RNA/DNA isolation, purification and hybridization
- PCR
- Electrophoretic mobility shift assays
- Cell culture
- Proliferation assays

EDUCATION

Ph.D., Malaria Immunology and Pathology: Cleveland State University – Cleveland, Ohio

Ph. D. Thesis: Molecular Organization of *Plasmodium falciparum* Erythrocytes Binding Proteins: Rhop-H and SERA

M.S., Biological Sciences: East Stroudsburg University – East Stroudsburg, Pennsylvania

M.S. Thesis: The Influence of Auxin (I.A.A.) Concentration on the Rate of Xylem Regeneration in *Coleus blumei*.

B.Ed. (Science), Biological Sciences: University of Nairobi – Nairobi, Kenya

Courses: Botany and Zoology

PROFESSIONAL EXPERIENCE

CONFLUENCE LIFE SCIENCES- BIOGENERATOR ACCELERATOR LABS, ST. LOUIS, MO..

JAN. 2013-APRIL, 2013

Senior Research Scientist

Assay design and development. Compound mechanistic studies using immune assays, biochemistry and cell biology approaches.

APSE LLC – BIOGENERATOR ACCELERATOR LABS., ST. LOUIS, MO AUG. 2011-DEC. 2012

Research Scientist

Research and development: Noval Nanomaterials using molecular approaches and microbial cultures. Execution of company research goals.

DEPARTMENT OF VETERANS AFFAIRS – ST. LOUIS, MISSOURI

2007-AUGUST 2011

Health Research Scientist

- Co-investigator for research project evaluating antimalarial mode of action of quinoline drugs (chloroquine, mefloquine and others) using whole human blood donated by health volunteers.

SAINT LOUIS UNIVERSITY SCHOOL OF MEDICINE – ST. LOUIS, MISSOURI

2005-2007

Senior Research Scientist

- Evaluating the role of ceramide in inflammation and mediation of asthma and pain pathogenesis
- Evaluating hypoxia/reoxygenation (oxidative stress) effects on endotoxin-induced proinflammatory response both *in vivo* and *in vitro*

METAPHORE PHARMACEUTICALS, INC. – ST. LOUIS, MISSOURI

2000-2005

Research Scientist I

Evaluated the pharmacological actions of a novel superoxide dismutase (SOD) mimetics:

- Utilized rodent pain models to study inflammation and actions of SOD mimetics
- Developed and used both biochemical and immunological assays to detect and study mediators of pain at the spinal cord level
- Showed that superoxide contributes to the process of tyrosine nitration of spinal cord proteins
- Studied inhibition of morphine tolerance by SOD mimetics in mice model
- Studied the pharmacokinetics of several SOD mimetics in rats

SAINT LOUIS UNIVERSITY SCHOOL OF MEDICINE – ST. LOUIS, MISSOURI 1996-2000

Postdoctoral Research Fellow

Studied the role of oxidative stress in proinflammatory cytokine production by macrophages:

- Demonstrated that hypoxia/reoxygenation selectively suppresses endotoxin-induced interleukin-1 β mRNA and protein expression in macrophages
- Demonstrated that superoxide plays an important role in endotoxin-stimulated production of tumor necrosis factor- α and interleukin-6 in alveolar macrophages. This effect is mediated by nuclear factor- κ B.

CLEVELAND STATE UNIVERSITY – CLEVELAND, OHIO

1990-1996

Ph.D in Malaria Immunology and Pathogenesis

Investigated the *Plasmodium falciparum* erythrocyte binding proteins:

- Studied the molecular organization and immunological characterization of *P. falciparum* erythrocyte binding proteins: Rhop-H and serine rich antigen (potential vaccine molecules)
- Teaching Assistant for biology majors

AWARDS

2006	American Thoracic Society Minority Trainee Travel Award and Recognition for Excellence in Research in Respiratory Medicine
1997	NIH (NIGMS) Postdoctoral Training Grant for Underrepresented Minority Scientist
1988-1990	Graduate Research Scholarship
1980-1984	Kenyan Undergraduate Scholarship

COMPUTER SKILLS

MS Word, MS Excel, MS PowerPoint, Adobe Photoshop and GraphPad Prism

PUBLICATIONS

1. Batinic-Haberle, I; Ndengele, M. M; Cuzzocrea, S; Reboucas, J. S; Spasojevic I. and Salvemini, D. Lopophilicity is a critical parameter that dominates the efficacy of metalloporphyrins in blocking the development of morphine antinociceptive tolerance through peroxynitrite-mediated pathways. *Free Radic Biol. Med.* 46: 212-219 (2009).
2. Ndengele, M. M; Cuzzocrea, S; Esposito, E; Mazzon, E; Di Paola, R; Matuschak, G. M; and Salvemini, D. Cyclooxygenase 1 and 2 contribute to peroxynitrite-mediated inflammatory pain hypersensitivity. *FASEB J.* 22: 3154-3164 (2008)
3. Ndengele, M. M; Cuzzocrea, S; Masini, E; Vinci, M. C; Esposito, E; Muscoli, C; Petrusca, D. N; Mollace, V; Mazzon, E; Dechun Li, Petrache, I; Matuschak, G. M; and Salvemini, D. Spinal ceramide modulates the development of morphine antinociceptive tolerance via peroxynitrite mediated nitroxidative stress and neuroimmune activation. *J. Pharmac. Exp. Ther.* 108 (2008)
4. Muscoli, C; Cuzzocrea, S; Ndengele, M. M; Mollace, V; Porreca, Fabrizi, F; Esposito, E; Masini, E; Matuschak, G. M; and Salvemini, D. Therapeutic manipulation of peroxynitrite attenuates the development of opiate-induced antinociceptive tolerance in mice. *J. Clin. Invest.* 117: 3530-3539 (2007)
5. Mukhopadhyay, S; Das, S; Williams, E. A; Moore, D; Jones, J. D; Zahm, D.S; Ndengele, M.M; Lechner, A. J. and Howlett, A.C. Lipopolysaccharide induction of CB2 cannabinoid receptors in rat brain microglia and murine macrophage RAW 264.7 cells. *J. Neuroimmunology* 181: 82-92 (2006).
6. Ndengele, M.M; Muscoli, C; Wang, Z. Q; Doyle T. M; Matuschak, G M. and Salvemini, D. Superoxide potentiates NF- κ B activation and modulates endotoxin-induced cytokine production in alveolar macrophages. *Shock* 23:186-193 (2005).
7. Muscoli, C; Mollace, V; Wheatley, J; Masini, E; Ndengele, M. M; Wang, Z. Q. and Salvemini, D. Superoxide-mediated nitration of spinal manganese superoxide dismutase: A novel pathway in N-methyl-D-aspartate-mediated hyperalgesia. *Pain* 111: 96-103 (2004).

8. Wang, Z. Q; Porreca, F; Cuzzocrea, S; Galen, K; Lightfoot, R; Masini E; Muscoli, C; Mollace, V; Ndengele, M.M; Ischiropoulos, H. and Salvemini, D. A newly identified role for superoxide in inflammatory pain. *J. Pharmacol Exp Ther* 309:869-78 (2004).
9. Cuzzocrea, S; Pisano, B; Dugo, L; Ianaro, A; Ndengele, M. M; and Salvemini, D; Superoxide-related signaling cascade mediates nuclear factor-kappa B activation in acute inflammation. *Antioxid Redox Signal* 4:699-704 (2004).
10. Ndengele, M. M; Bellone, C. J; Lechner, A. J. and Matuschak, G. M. Brief hypoxia differentially regulates LPS-induced IL-1 β and TNF- α gene transcription in RAW 264.7 cells. *Am J Physiol Lung Cell Mol Physiol* 278:L1289-96 (2000).
11. Sam-Yellowe, T. Y; Fujioka, H; Aikawa, M; Messineo, D. G; Leash, A. M; Hall, T; Drazba, J. A. and Ndengele, M. M. Molecular Organization and cross-linking analysis of the *Plasmodium falciparum* erythrocyte binding proteins Rhop-H and SERA. *J. Protozool. Res.* 10: 128-154 (2000).
12. Ndengele, M. M; Messineo, D.G; Sam-Yellowe, T Y. and Harwalker, J. A. *Plasmodium falciparum*: Effects of membrane-modulating agents on direct binding of rhoptry proteins to human erythrocytes. *Exp Parasitol* 81:191-201 (1995).
13. Sam-Yellowe, T. Y. and Ndengele, M. M. Monoclonal antibody epitope mapping of *Plasmodium falciparum* rhoptry proteins. *Exp. Parasitol.* 76:46-58 (1993).

CONFERENCE PRESENTATIONS

1. Ndengele MM, Muscoli C, Matuschak GM, and Salvemini D. Differential regulation of cytokine generation by inhibitors of ceramide and SIP in LPS-stimulated RAW cells. Annual Meeting of the American Thoracic Society, San Francisco, California. 2007
2. Salvemini D, Matuschak GM, Ndengele MM, and Masini E. The ceramide metabolic pathway: A key pathway in asthma. Annual Meeting of the American Thoracic Society, San Francisco, California. 2007
3. Masini E, Nistri S, Cinci I, Uliva C, Marzocca C, Cohmair SAA, Serpil C, Erzurum CS, Li D, Ndengele MM and Salvemini D. Ceramide-driven oxidative/nitrative stress. A key pathway in asthma. Nitric Oxide Meeting, Urbino, Italy. 2006
4. Ndengele MM, Doyle TM, Salvemini D, Lechner AJ, and Matuschak GM. Superimposed brief hypoxia modulates endotoxin-induced activation of p38 mitogen-activated protein kinase (MAPK) and AP-1 binding in RAW 264.7 macrophages. Annual Meeting of the American Thoracic Society, San Diego, California. 2006
5. Ndengele MM, Wang ZQ, Doyle TM, Matuschak GM, Salvemini D. Superoxide-mediated regulation of NF- κ B and p38 kinase activation modulates *E. coli* endotoxin-induced cytokine production in alveolar macrophages. Annual Meeting of the American Thoracic Society. Atlanta, Georgia. 2002.
6. Ndengele MM, Bellone CJ, Lechner AJ, Matuschak GM. *E. coli* lipopolysaccharide-induced activation of activator protein 1 (AP-1) and p38 mitogen-activated proteins kinase (MAPK) are differentially affected by brief hypoxia in murine RAW 264.7 macrophages. Annual Meeting of the American Thoracic Society. San Francisco, California. 2001.
7. Ndengele MM, Bellone CJ, Lechner AJ, Matuschak GM. Hypoxic suppression of LPS-induced NF- κ B activation and IL-1 transcription are independent of changes in I κ B α kinetics or compartmentalization of RAW cells. Annual Meeting of the American Thoracic Society. San Francisco, California. 2001.
8. Ndengele MM, Bellone CJ, Lechner AJ, Matuschak GM. Brief hypoxic stress differentially modulates *E. coli* LPS- induced IL-1 β vs. TNF- α gene expression at transcriptional and post-transcriptional levels in RAW 264.7 cells. Annual Meeting of the American Thoracic Society. San Diego, California. 1999.
9. Ndengele MM, Cabrera I, Sam-Yellowe TY. The 120 kd erythrocyte binding protein is a serine rich antigen. The 47th Meeting of the Society of Protozoologists. Cleveland, Ohio. 1994.
10. Ndengele MM, Sam-Yellowe TY. The solubility properties of *Plasmodium falciparum* rhoptry proteins in mild detergent preparations. The 67th Meeting of the American Society of Parasitologists. Philadelphia, Pennsylvania. 1992.

SARA J. BLAMEY

Director of the Helix Center Core Laboratory
MICROBE INOTECH LABORATORIES, INC.

Summary of Current Position, January, 2013 to Present:

**Helix Center Core Laboratory, a satellite lab of the MiL inc.,
Director of Core Lab, Jan. 2013 - Present**

Sara's responsibilities include training Center tenants on the use of the shared equipment, writing and revising standard operating procedures, and organizing the scheduling of the shared equipment online. She also manages the core lab's fee based lab services which provide additional support and microbiological testing options for the Center's tenants.

Employment Experience (Previous Positions):

Microbe Inotech Laboratories, Laboratory Manager, Sept. 2008 – Dec. 2012

As Laboratory Manager, responsibilities included training employees, writing and revising standard operating procedures, processing client samples, communicating with clients regarding sample progress or new projects, and communicating with vendors regarding lab supplies. Served also as Office Manager at times with shared responsibilities for report preparation and accounting (AP/AR) duties.

Microbe Inotech Laboratories, Senior Microbiologist II, Nov. 2006 – Sept. 2008

Primary responsibilities included operation of complex microbiological identification instruments utilizing standard laboratory methods and operation procedures. Perform isolation and identification of numerous species of microorganisms from soil, ground, and drinking water, food and pharmaceutical product. Instruments used in identification include Carbon Utilization: BiologTM and VIDASTM. ELISA and VITEKTM methods for detection of Salmonella, Listeria and E. coli 0157:H7 and other pathogens. Performs kinetic assay studies which determine microbial population growth in the presence of growth stimulants or inhibitors, i.e. nutrients, biocides and antibiotics, etc.

Monsanto Lab Tech I, January 2006 – October 2006

Monsanto's Plant Genetic Purity Laboratory. St. Louis MO. Performed the set up of mass DNA amplifications for SNP tests. Charged with responsibility for the analysis of SNP test results and performance of automated liquid handling programs in addition to LIMS sample logging and entry.

Part Time Retail Store Associate, July 2005 - December 2005

2nd Street Beads. St. Charles, MO. Entered data into inventory system and assisted customers in selecting and purchasing merchandise.

Customer Care Professional, August 2005 - November 2005

United Health Care, Uniprise Division. Maryland Heights, MO. Responsible for answers to member questions regarding insurance benefits and also assisted members to find medical providers in their area.

Retail Store Manager, November 2003 - June 2005

Earth, Wind, & Bead, Mid Rivers Mall, St Peters, MO. Directed employees in daily tasks. Duties included entry of data into inventory system, restocked and organized merchandise as well as assisting customers in selecting and purchasing merchandise.

Education:

2003 B.A. Biochemistry Knox College - Galesburg, IL

Internship Programs:

Microbe Inotech Laboratories, St. Louis, MO April 2006 - October 2006

Prepared growth media, counted bacteria, yeasts, and other fungi on different growth media. Physical set up of kinetic assays using 96 and 384 well microplate readers and other instrumental methods of microbiology..

Illinois State Police Forensic Lab, Morton IL. September 2002 - October 2002

Assisted with inventory. Updated parts of the ballistics reference collection. Made stock solutions for the Drug Chemistry Department. Observed several Biology and DNA case workups. Performed basic office functions such as filing and photocopying

Instrumental & other technique proficiencies:

Vitek2 Compact (microbial ID), VIDAS (Vitek ImmunoDiagnostic Assay System), MOBio DNA extraction, Neogen *Salmonella*, *Listeria*, and Histamine ELISAs, MiniMag DNA extraction, Genetic ID Fast ID DNA extraction, qPCR, Nanodrop, Biolog ID System, SoftMax pro kinetic assays, Agilent bioanalyzer 2100 (lab on a chip) assays, gel electrophoresis, column chromatography, protein purification, sterile techniques.

<p style="text-align: center;">ROBERT J. HOFFMANN</p> <p style="text-align: center;">OFFICE & IT MANAGER MARKETING & SALES MICROBE INOTECH LABORATORIES, INC.</p>
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Summary of Current Position, Sept. 2008 to Present:

Full accounting responsibilities of handling accounts payable and receivable interfacing with corporate accountants and company president. Handles also through an outside payroll service all HR and payroll functions. Uses skills in computer technology to support company infrastructure for both distributed offices as well as laboratories. Oversees the creation and implementation of marketing, advertising and promotional materials and activities. Establishes marketing strategies to meet organizational objectives. Evaluates customer research and implements marketing plan changes as needed.

Employment (Previous Positions):

July 2004 – Sept. 2008 First Heartland Companies, Lake Saint Louis, MO
License & Contracting Coordinator

- Responsible for the licensing and contracting of 300+ producers in all 50 states
- Maintained expansive licensing and contracting databases
- Setup and ensured correct commission payouts to insurance producers
- Presented licensing presentations on a regular basis
- Provided voice-over work for company's website and phone menu

July 2003 – July 2004 Earth Wind & Bead, St. Louis, MO
Store Manager

- Managed a staff of upward to 10 employees
- Created and implemented in-store promotional material and displays
- Entered data in multiple retail databases
- Responsible for merchandise display, flow, and organization
- Handled large amounts of cash and cash wrap procedures
- Oversaw the training of assistant managers, key-holders and associates

Oct. 2001 – May 2003 Scrubs & Beyond, St. Louis, MO
Key-Holder

- Assisted management with the operation of two stores
- Responsible for merchandise display, flow and organization
- Handled cash-wrap procedures
- Assisted with the training of sales associates

Apr. 2001 – Oct. 2001 Waldenbooks, St. Louis, MO
Sales Associate/Bookseller

- Customer service No. 1 priority
- Helped to maintain organization of store and merchandise

Education:

B.A., 2002, Cum Laude Graduate of University of Missouri – St. Louis with a degree in Mass Communications focusing in theory, public relations and advertising

A.A., 2000, Graduate of St. Louis Community College – Meramec, St. Louis, MO with a degree in Mass Communications with a focus in public relations, advertising, and radio

May 2002 – Aug. 2002 Scrubs & Beyond, St. Louis, MO

Marketing Intern

- Marketing analysis of promotional material
- Marketing research for new store locations
- Analyzed catalog and Internet sales and processed catalog and Internet orders
- Filing and data entry

Additional Information and Certifications:

Public relations volunteer for SSM St. Joseph's Hospital, St. Louis, MO, assisting with various PR projects and website maintenance

Obtained the ACT's CAAP Certification in Writing Proficiency

Michele R. Gossett

LABORATORY & INTERN MANAGER
Research Analyst, Environmental & Industrial Hygiene
Chemist/Microbiologist
MICROBE INOTECH LABORATORIES, INC.

SKILL BASE: Occupational Safety Advisory • Environmental Analysis • Primary, Secondary & Experimental Research • Laboratory Quality Control • Customer Service • Statistical Analysis • Inorganic & Organic Chemistry • Chromatography & Spectrometry • Microsoft Office

CURRENT POSITION:

Microbe Inotech Laboratories, St. Louis, Missouri • August 2009 - Present
Laboratory Manager

Performs day to day operations of overseeing the flow of samples through sample check process, sample preparation, sample analysis and results reporting. Maintains inventory of lab supplies. Organizes all training documents for internships and Standard Operating Procedures (SOPs) for the laboratory. Oversees the orientation and training of both international and national interns.

PREVIOUS EXPERIENCE:

STERIS, St. Louis, Missouri • January 2008 - April 2009

Company makes sterilization systems for health care, research and industrial markets..

Contract Associate Scientist

Performed research and statistical analysis within experiments, utilizing various laboratory techniques including wet bench and instrumental techniques, to subsequently present findings designed to further product development.

Major Contributions:

- Devised a titration method used to guarantee accuracy in chemical compositions, and verify theoretical calculations, to ensure the stability of stock quantities in inventory.
- Performed secondary research on current technologies and applicable techniques to augment laboratory procedures and mentor other chemists.
- Compiled and published reports summarizing experimental findings used to complement customer deliverables and reports.

ST. LOUIS UNIVERSITY, St. Louis, MO • September 2004 - May 2006

College of Arts & Sciences

Work Study/Office Aide

Provided students with preliminary curriculum advice, as well as, organized and maintained student records.

Major Contributions:

- Revised and improved graduated students' record archive.

OFFICE OF CITY MANAGER - UNIVERSITY CITY, University City, MO • June 2005 - August 2005

Executive and administrative office of University City's Mayor responsible for support to all municipal departments and managing an annual budget of \$25M

City Management Intern

Major Contributions:

- Conducted original primary and secondary research, including surveys and interviews, to determine the correlation of successful recycling programs and populace participation within St. Louis County and presented actionable policy recommendations.
- Researched and developed a grant proposal application to the National League of Cities requesting resources to develop and promote wealth building strategies among the low income families.
- Conducted qualitative research, and analyzed the results via Geographic Information Systems software, to aid in the rewriting and improvement of a city ordinance for University City.

DATAChem (Now ALS Laboratory Group), Taylorsville, Utah • February 2001 - August 2003

An environmental, industrial hygiene, microbiological/mycology analytical testing services company.

Environmental & Industrial Hygiene Chemist

Served as a customer contact for project conflict resolution, responsible for commercial and government chemical samples while utilizing NIOSH and OSHA methods for instrumental techniques consisting of High Performance Liquid Chromatography, Ion Chromatography and Thermal Gravimetric Analyzer

Major Contributions:

- Successfully analyzed industrial hygiene samples under a time critical and high visibility client request for samples emanating from the World Trade Center terrorist attacks in September 2001.
- Provided ongoing safety advisory as a member of Datachem's Safety Committee.

MOXTEX, Orem (Now Polatechno Co. Ltd), Utah • May 1999 - February 2001

Manufacturer of analytical x-ray components including thin films, ultra-low noise electronics and miniature x-ray sources with annual revenues of ~\$15M.

Assistant Safety Officer

Researched and developed policies and procedures for neutralizing and disposing of hazardous wastes. Performed audits and inspections to maintain and ensure all records were compliant with applicable regulations and codes.

Major Contributions:

- Maintained a 100% accident free department by recognizing potential hazards and subsequently implementing safety policies/procedures across three research groups that included 80 engineers and technicians.
- Provided new employee safety orientation instruction and conducted yearly staff safety training.
- Organized and hosted companywide first aide/CPR classes.

BRIGHAM YOUNG UNIVERSITY, Provo, Utah • January 1998 - August 1998

Department of Chemistry and Biochemistry

Laboratory Research Assistant

Performed research under Dr. Boerio-Goates as part of the Basic Energy Sciences research grant, U.S.

Department of Energy

Major Contributions:

- Synthesized and analyzed coronene and corannulene crystals utilizing the DSC-TGA to further enhance Dr. Boerio-Goates nanotechnology research.

ENGINEERED LUBRICANTS, St. Louis, Missouri • July 1994 - August 1997

Private company providing specialty lubricants, greases and related services

Petroleum Laboratory Technician

Analyzed and created reports for petroleum samples utilizing various wet bench and instrumental techniques.

Major Contributions:

- Optimized Inductively Coupled Plasma Spectrometer procedures and analyzed petroleum products.
- Operated the Automatic Viscometer and the FTIR under company quality control standards.

EDUCATION (M. Gossett)

Master of Arts in Public Administration, 2006

Saint Louis University, Saint Louis, Missouri

Secondary Education Chemistry teaching certificate, 1999

Brigham Young University, Provo, Utah

Bachelor of Arts in Chemistry, 1993

Southern Illinois University, Edwardsville, Illinois

PUBLICATIONS

Carbon-13 Shift Tensors in Polycyclic Aromatic Compounds. 8.1 A Low-Temperature NMR Study of Coronene and Corannulene

Anita M. Orendt, Julio C. Facelli,[†] Shi Bai, Amarjit Rai,[‡] Michele Gossett,[§] Lawrence T. Scott,[‡] Juliana Boerio-Goates,[§] Ronald J. Pugmire, and, and David M. Grant*

The Journal of Physical Chemistry A **2000** 104 (1), 149-155

Ben Winkler

Research Laboratory Manager
MICROBE INOTECH LABORATORIES, INC.

Current Position:

June 2012 – Present **Microbe Inotech Laboratories, Inc.**
St. Louis, MO

Research Laboratory Manager

- Speak with clients to assess their needs and develop/match custom microbiological assays to fit them
- Manage projects, analyze/compile data and write client reports
- Train laboratory technicians on laboratory techniques/SOPs
- Effectively maintain GLP while reducing material costs
- Manage pipeline of projects to ensure timely results and client satisfaction

Previous Work Experience:

Mar. 2011 – June 2012 **Monsanto** St. Louis, MO

Laboratory Technician

- Perform PCR based SNP testing on prepared corn DNA samples and score data based on these tests
- Prepare markers used in SNP tests
- prepare incoming samples for various genetic purity tests
- Equipment used: FX, wellmate, biooven, Taqpro program, seed grinders, LIMS software

Jan. 2009 – Aug. 2011 **Microbe Inotech Laboratories, Inc.**
St. Louis, MO

Microbiology Intern (part-time)

- Performed various microbiological/biochemical assays (e.g. Plating/counting, Salmonella, Listeria, microbial DNA isolations, Gram staining, protein determination, histamine, Biolog)

- Technical skills/equipment used: VIDAS, VITEK, plate readers, DNA isolation, pipetting, media preparation, plating, sterile lab techniques

Jan. 2010 – Dec. 2010 **Saint Louis Zoo** St. Louis, MO

Research Intern

- Participated in a collaborative behavioral study with National Park Service and US Fish & Wildlife Service's Island Fox Recovery Program focused on the endangered Channel Island foxes
- Participated in a collaborative study with Washington University focused on captive breeding of Grevy's Zebra and Somali Wild Asses

Education

Aug. 2008 – Present **Southern Illinois University**
Edwardsville, IL

Degree program: M.S. Environmental Toxicology

- Credit hours completed: 36
- Current GPA: 4.0
- Expected graduation: 08/2012
- Research emphasis: Aquatic toxicity study looking at the acute and reproductive toxicity of persistent pharmaceuticals on *Daphnia magna*.

Aug. 1998 – May 2004 **Miami University** Oxford, OH

B.S. Degree Major: Psychology Thematic Sequence:
Zoology

- Course work: Physiology, Microbiology, Organic Chemistry, Psychopharmacology, Physics and all related laboratory courses (19 credit hours of laboratory coursework in all). Bachelor's degree obtained.

Honors and Extracurricular

SIUE Env. Sciences Outstanding Grad. Student award (2011),
Theta Chi Fraternity, Miami University Club Hockey Team