Sporometrics

Most of the time we are unaware of the vast sea of microbes around us. But despite their tiny size, these organisms are enormous in their influence on our lives, good and bad. Our experts provide you with knowledge to manage them.

Environmental, Medical and Industrial Microbiology.

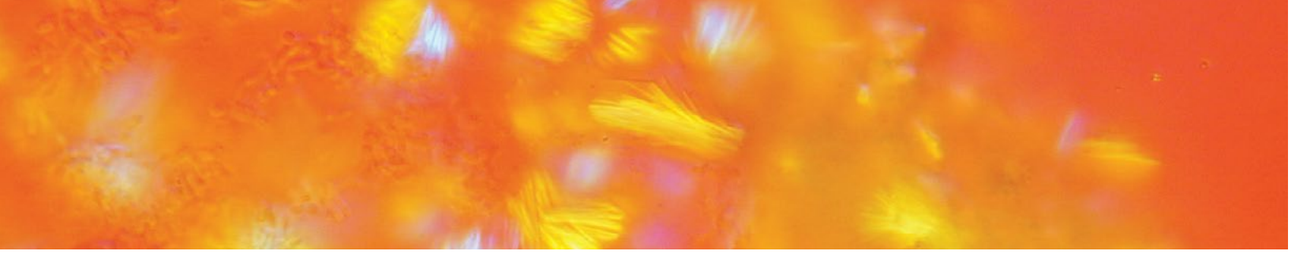
About Sporometrics

Established in 1993, Sporometrics is a Canadian leader in scientific research on environmental, medical and industrial microbes. Housed in a 3,500-square-foot, purpose-built laboratory facility in Toronto, we provide analytical services, contract research and expert support to consulting and engineering firms, industry and government. The knowledge we generate facilitates the objective, scientifically-based assessment and resolution of a wide array of microbiological problems.

Our expertise spans both industry and academia—a rare and valuable combination. A quarter of our team members have terminal degrees at the PhD level, two hold university faculty positions, more than half have Master's level education, and we all have extensive real-world microbiological experience. Our talented team includes mycologists and microbiologists, industrial hygienists, biosafety & biosecurity experts, phytopathologists, and education specialists.

Cutting edge science for real world solutions

We operate a fully compliant ISO 17025-accredited Biosafety Level 2 laboratory, outfitted with research-grade equipment for visible light-and epifluorescence microscopy, in vitro physiological and biochemical testing, and long-term preservation of living strains. Our facility has a dedicated molecular genetics laboratory to support state of-the-art DNA diagnostics including sequence-based identification, and real-time PCR detection and quantification of bacteria, fungi and viruses. This tool-kit, combined with our industry-leading knowledge base, comprise the rock-solid scientific foundation of our work and our client partnerships.



Every sample tells a story.

The Process

Our clients come to us from every sector. They bring a diversity of microbial challenges – from the assessment of microbes in indoor air, to the evaluation of contaminants in foods, pharmaceuticals and manufactured goods, to the characterization of exotic plant- or animal diseases. Their problems are often complex, with substantial health, economic and legal implications. Our process begins with a specimen and asks 5 simple yet powerful questions:

1. What is it?

Some microbes are easy to identify. Some are hard. Most laboratories stop here because some microbes cannot be identified – scientists have yet to discover them. We don't stop. Easy, hard, or undiscovered, we tackle them all. Collectively, our scientists have discovered and scientifically named well over a dozen new species, half a dozen new genera, two new families, and even a new order.

2. Where did it come from?

A name distinguishes one organism among millions. It is the key that opens a vault of specialized knowledge. It is the first step to discovery, not the end of a report. Our experts know microbes. We know where they live and how they get around. Armed with the most accurate identifications in the industry, we provide our clients with access to unparalleled expertise to help them track down the culprit.

3. What risks does it pose?

Taking action can be costly. Failure to take action can cost far more. An informed decision-making process prevents costly or tragic errors. Informed decisions require a systematic, expert evaluation of risk. Rare or new microbes present unique challenges, often requiring access to priviledged knowledge. As part of microbiology's inner circle, we are able to access cutting edge information well before it is publicly available.

4. How can it be fixed?

Repairing, cleaning and restoring a structure or process to an uncontaminated state requires a complete understanding of the problem, thoughtful consideration of each and every alternative, and full awareness of the shifting regulatory landscape. We assist our clients to develop sound solutions based on the best available, most rigorously defensible science.

5. Did the solution work?

Quality assurance is the pathway to confidence that a durable solution has been achieved. Whether this means sampling to provide comfort that the job was done right, or ongoing monitoring to ensure sustainability, we help our clients define the most appropriate quality assurance strategy to suit their project.

Other labs give you an answer. We give you the answer.

Commitment

Getting you the right answer is our commitment, its our promise, and its our pleasure. Our commitment starts with dedication. Whether its analyzing an indoor air sample in a small project or conducting a large, custom-tailored research project, at Sporometrics we love what we do and our dedication shows. We've invested extensively in cutting edge equipment and resources to create an uncompromising, research-grade laboratory facility. Our staff are the best in the business. Prior to performing independent lab work, each of our analysts completes our rigorous, industry-leading, year-long training program and must pass a series of external, proctored examinations to attain an official certification from the Pan American Aerobiology Certification Board (PAACB). And just like our analysts, our scientists know their stuff too. They're just as comfortable pouring over 18th century leather-bound Latin volumes from our mycological library as they are sequencing hyper-variable DNA barcoding genes. At Sporometrics, we have the knowledge, the resources and the commitment to meet your unique challenge.

CASE STUDY:

Ecology solved the puzzle

Culture-based air sampling in the kitchen of a large, institutional complex turned up a colony of a very unusual species, Ascodesmis nigricans, a highly reduced cup fungus whose globose ascospores are ornamented with a network of minute, purple ridges.

Most laboratories encountering this species would simply report it as "other" or "unknown", because it wouldn't fit their preset reporting template. But just like nature, at Sporometrics we have no such preset template. We report what we find. And we identify each taxon as accurately and precisely as scientifically possible.

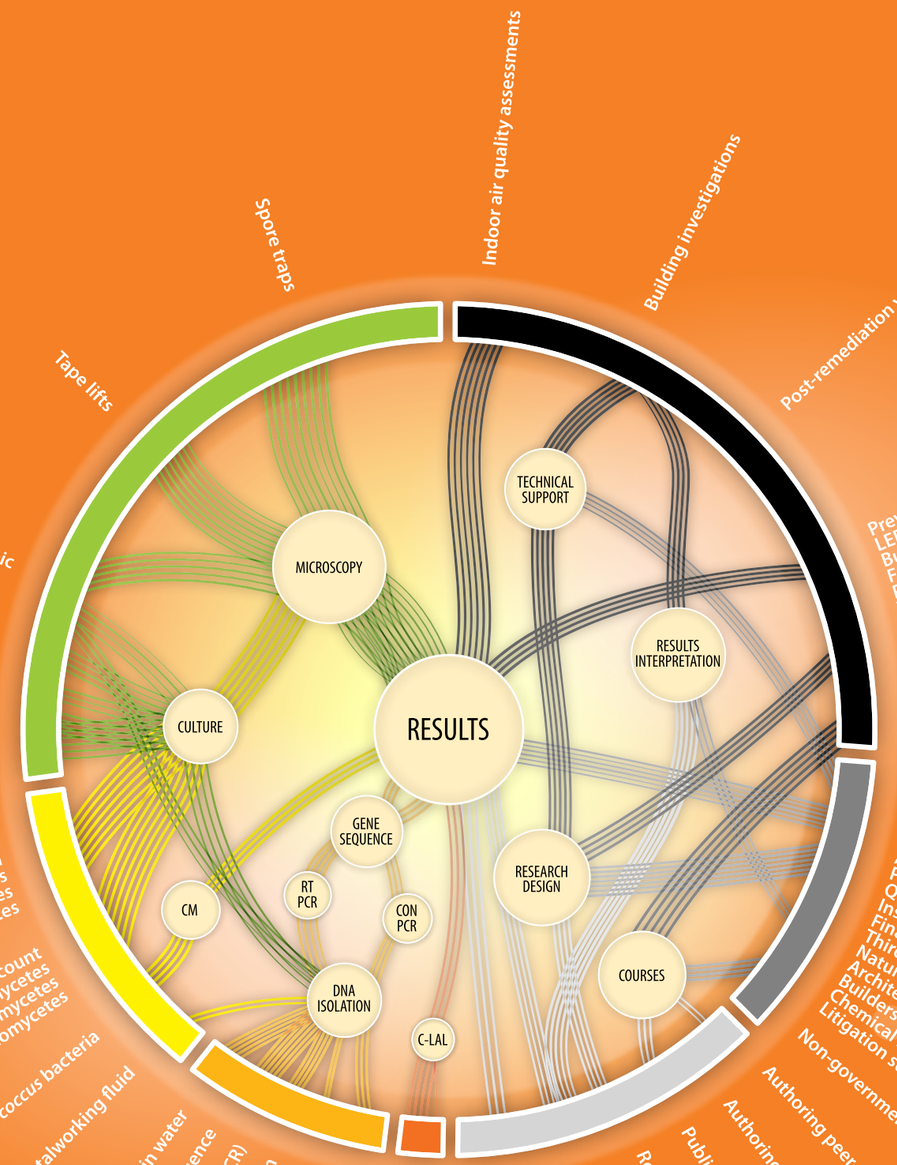
Ascodesmis nigricans, in this case, turned out to be a smoking gun. Armed with the knowledge of its peculiar ecology, we were able to guide our client to discover a concealed but serious problem. Ascodesmis nigricans is a coprophilous fungus – a species that grows characteristically on animal feces. Following the initial air sampling, based on our advice, a close investigation of the building complex revealed a concealed space beneath the floor with a leaking sewage pipe.

Scientific Analyses

- Fungi/Moulds
- Bacteria
- DNA
- Biochemical

Applications

- Environmental consultants
- Industry
- Public sector



Spore traps
Tape lifts
Bulk direct microscopic
Pure culture
Bulk culturable
Fungal indoor air quality – culturable analysis
Opportunistic fungal pathogen screen
Bulk & air samples bacteria gram stain, morphology & viability
Air samples heterotrophic plate count / total culturable bacteria
Air samples mesophilic actinomycetes
Air samples psychrophilic actinomycetes
Air samples thermophilic actinomycetes
Bulk & swab heterotrophic plate count
Bulk & swab mesophilic actinomycetes
Bulk & swab psychrophilic actinomycetes
Bulk & swab thermophilic actinomycetes
Bulk, air & swab *E. coli* and *Enterococcus* bacteria
Mycobacterium immunogenum in metalworking fluid
Legionella pneumophila in water
Bacterial DNA barcode sequence
Aspergillus screen (RT-PCR)
Avian pathogen screen
Blastomyces dermatitidis screen
Fungal DNA barcode
Phytoplasma
Endotoxin in dust / swab / air (chromogenic LAL)
Beta-(1,3)-D-glucan (chromogenic LAL)
Laboratory proficiency testing provider
Research and development
Public policy / guidelines
Authoring industry guidelines
Authoring peer-reviewed articles and books
Non-governmental Organizations (NGOs) projects
Litigation support
Chemical manufacturers – process development
Builders & developers best practices
Architectural design
Natural resource industry research
Third party testing services
Financial institutions – policy consultation
Insurance investigations
Quality control for pharmaceutical, food, and manufacturing
Product development
Agricultural research
Retailers / product spoilage
Shipping & transportation microbial issues
Manufacturing process contamination
Food & beverage product contamination
Pharmaceutical innovation
Proactive / baseline study
Exposure assessment
Building envelope study
Insurance requirement / claim
Pre-construction survey
Building related illness
Financial due diligence
Water release response
Product / contents contamination
Forensic engineering / investigation
Building commissioning
LEED studies
Preventative maintenance program
Post-remediation verification
Building investigations
Indoor air quality assessments

CM – chromogenic media
PCR – polymerase chain reaction
RT – real-time PCR
Con PCR – conventional PCR
C LAL – chromogenic LAL

Accredited to the ISO/IEC 17025:2005 standard by the Environmental Microbiology Laboratory Accreditation Program (EMLAP) of the American Industrial Hygiene Association Laboratory Accreditation Program, LLC.

Analysts certified by the Pan American Aerobiology Certification Board (PAACB)

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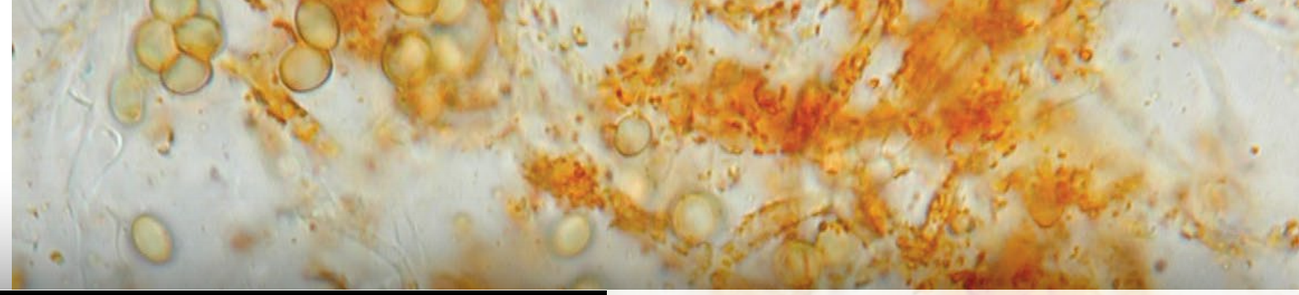

Microbes interact. So do we.

Collaboration

Sporometrics is tightly interlinked with the international microbiology research community. Our scientists are continuously engaged in highly productive collaborations with an extensive range of expert researchers and clinicians. Collectively, they've published hundreds of peer-reviewed articles in collaboration with over 600 scientists and medical specialists. As one of only 16 industrial member organizations of the World Federation of Culture Collections – a world-wide consortium of 585 repositories of living biodiversity in 68 countries representing all known free-living forms of microbial life on earth – our collection houses thousands of strains of living fungi, bacteria, viruses and phytoplasmas, many of which are unique. We collaborate with other biological resource collections and members of the research community to ensure the availability of these valuable resources for research. We draw on these collaborative links to support questions requiring highly specialized expertise. As our client, you have unique access to an unprecedented breadth of expertise through our world-wide network of collaborators.

CASE STUDY:

Secure protection for precious biodiversity

The new millennium heralded a redoubled urgency to protect and preserve biodiversity under threat from global climate change while at the same time the political landscape shifted to impose unprecedented constraints intended to prevent the malevolent use of microbes.

Shortly after the 9/11 attacks, a Canadian military scientist sought to obtain a set of microbial cultures from colleagues in the US, in order to conduct government research on new testing methods to support emergency preparedness. Despite the availability of research funding and intergovernmental research support agreements, US federal officials barred the export of the cultures and the research project was abandoned.

Recognizing that our national research and security needs should not be reliant upon resources held in other jurisdictions, the federal government sought a strategy to ensure the domestic security and availability of biological resources. In collaboration with our network of national and international researchers and partners from Health Canada and Agriculture & Agri-Food Canada, Sporometrics was retained to draft a bold national strategy to preserve these precious resources securely while ensuring vital access.

CASE STUDY:

The angels' share

The process of maturing spirits in wooden casks has been practiced for centuries. Aging imparts desirable characters to the taste and aroma of the products at the cost of a nominal amount of alcohol lost to evaporation in the process – a loss described optimistically by the French as "la part des anges" or the angels' share.

In low-lying areas, this loss is often accompanied by warehouse staining – conspicuous, darkly coloured streaking on all manner of exposed, neighbouring surfaces, sometimes at great distance. Sporometrics was called upon by a multinational manufacturer to clarify the nature of this growth and the circumstances leading to its establishment.

Our findings were groundbreaking. We discovered that warehouse staining consists predominantly of a single microfungus which proved to be a new genus we named Baudoinia. Rather than simply using alcohol as food, Baudoinia interprets a tiny whiff as a metabolic checkered flag – an all-clear signal to start growing. This wayward waft of booze also gives Baudoinia forewarning that good growing may mean hot sun, thus allowing its cells time to prepare themselves.

Other labs cite books. We write them.

Discovery

At Sporometrics, nothing we do is routine. With every test we conduct, each specimen we examine, and every question we ask, we anticipate discoveries that expand the frontiers of what we know. Collectively, our scientists have discovered and scientifically named a wealth of new fungi and bacteria, including over a dozen new species, six new genera, two new families, and a new order. We've isolated and named half a dozen previously unknown microbial biochemicals. And we've also revealed completely new ways in which microbes interact. Our discoveries have formed the basis of the numerous peer-reviewed scientific articles and books we've written. Our discovery-focused approach meets the diverse research needs of our clients, whom we assist in a range of areas, including: elucidating and controlling microbial spoiling of products, foods and drugs; custom biodeterioration testing and protocol development; forensic analysis of microbial evidence; and infection control and prevention. In these efforts, we assist our clients to define sound research questions, and we develop protocols and timelines that meet their needs and budgets.

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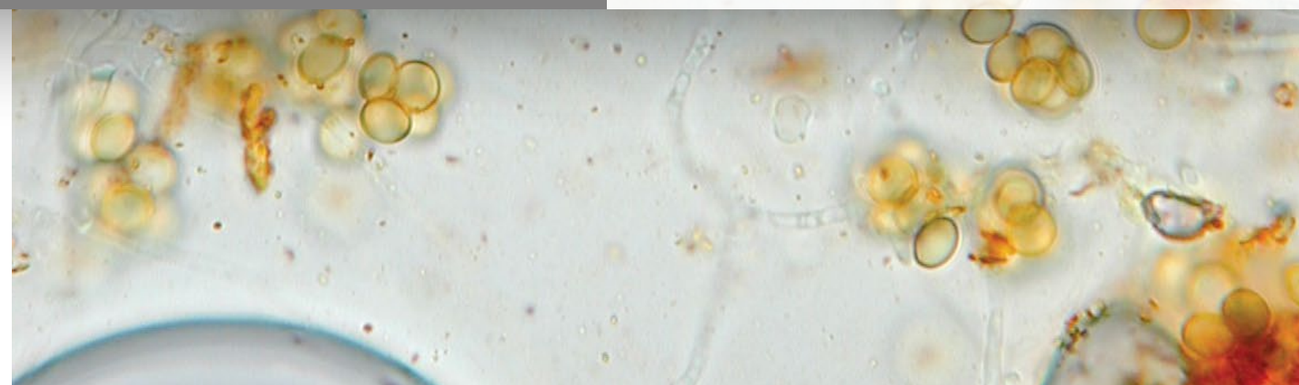


CASE STUDY:

Rapid detection of opportunistic fungal pathogens

Air sampling in heath care environments presents a series of unique challenges to the IAQ investigator. Often, the occupants of these environments have illnesses that make them more susceptible than the general population to infections caused by environmental microbes.

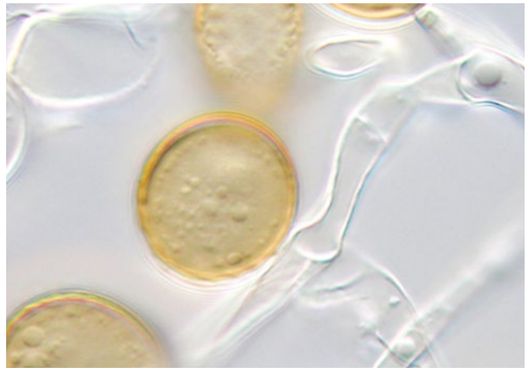
Heavy demands placed on limited space such as wards and surgical theatres make it difficult to take these areas out of service for even short periods of time. The unique need to use culture-based sampling in these environments has traditionally required 10–14 days of incubation prior to the release of results.

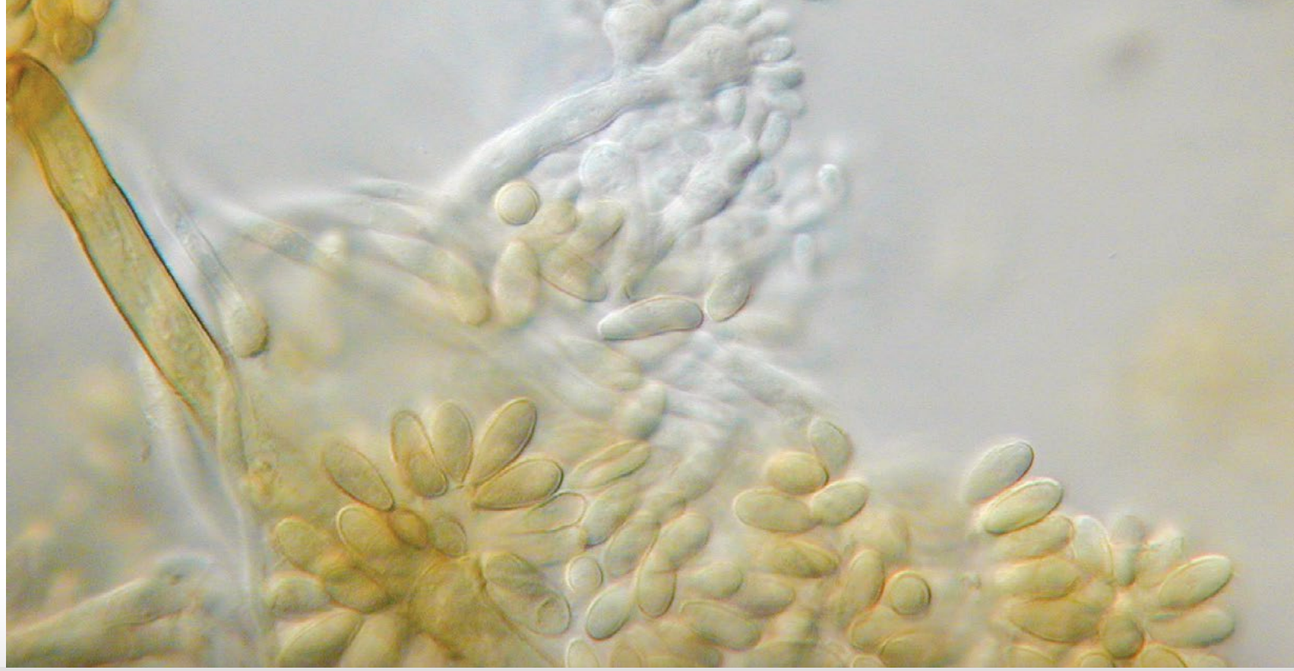
When a health care client confronted us with the comment "We can't wait for 10 days to get results, the hospital needs the room now", we promptly set to work to find a better way. Drawing upon our vast experience in medical mycology, we designed a special new test, the opportunistic fungal pathogen screen (OFPS), which allows health-care IAQ investigators to rule out the presence of these harmful fungi after only 48 hours.

Microbes adapt. We do too.

Innovation

Because we are scientists, first and foremost, we appreciate the potential to encounter new or unique situations that mandate innovative solutions. We have devoted considerable effort to conduct basic research into many aspects of aerobiology in an effort to provide our clients not only the very latest sampling and analysis technologies but also a rigorous assessment of the benefits and limitations of these methods. We were the first group internationally to publish empirical data on the biological collection efficiencies of the most commonly used culture-based air samplers – the Andersen N6 and the RCS Biotest. In an effort to better prepare our clients to interpret their air testing results, we have also conducted extensive scientific surveys of the outdoor aerospora to determine the "normal" species present and their typical concentrations at different times of year across Canada. We assist clients as well in the selection of appropriate sampling and testing methods in consideration of their needs, and if our clients present us with a never-been-done-before request, chances are we can custom design and validate a new procedure to meet their challenge.





Learning Opportunities

Take advantage of our unparalleled expertise. We offer a range of continuing education courses and seminars on microbial sampling, mitigation and laboratory methods tailored to professionals in fields such as IAQ, hygiene, medicine, food, drug and product manufacturing. Many of our courses are eligible for continuing education credits towards the maintenance of a wide range of professional certifications.

Examples of our course offerings include:

- Sampling Methods and Interpretation of Lab Results for Fungi and Bacteria
- Legionella and Legionellosis
- Introduction to DNA Analysis of Fungi and Bacteria
- Taxonomic Advancements in Medically Significant Fungi
- Ecology of Indoor Mould
- Detection, Protection, Litigation

Tailored courses:

In addition to our regular course program, we design courses tailored to the needs of our clients. We can provide specialized training for field-based or laboratory-based scientists in our world-class facility, or tailored group training in your workplace. Get in touch to discuss sector-specific learning opportunities.

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219 Dufferin Street, Suite 20C Toronto, ON Canada M6K 1Y9
T. 888.516.1660 | F. 416.516.1670 | www.sporometrics.com