Sabatino Nacson, Ph.D.

93 Crown Heights Crescent, Thornhill, Ontario L4J 5T1
Tel.: (905)-881-5287
sabatino.nacson@rogers.com

Summary

Ph.D. in Analytical Chemistry and 25 years of comprehensive knowledge in new product development, engineering, chemistry, instrumentation and field applications, my experience covers pharmaceutical, security, life science, environmental, and industrial environments .Ensure that norms, regulations and standards are observed by engineers, technicians and other personnel with the context of ethics, safety and regulations. A problem solver and decision-maker who are constantly upgrading skills while innovating new ways to improve efficiencies. As well as being a strong individual contributor, effective leader and co-operative team player who contribute to the achievement of team targets. Fluent in English, French, Italian and Arabic .

Education

- Ph.D. (Analytical Chemistry) University of Toronto, 1986
- Master of Engineering - Institute of Aerospace Studies 1981
- Honour B.S. (Chemistry) York University, 1978
- Electrical Technologist Don Bosco Institute of Technology (Italy) 1971

Professional Experience

TeknoScan Systems Inc., Vaughan, Ontario **2008 -Present**

Chief Technical Officer (CTO)

- Focus on new products development in security market, environmental and Pharmaceutical industry
- Areas of research leading to new product developments such as cargo screening for illicit drugs, explosives, illegal immigrants and contraband products like tobacco, alcohols and band food products.
- R&D efforts to introduce novel approaches for screening of people at airports, border crossing and protection of sensitive structures like nuclear stations, sports events and transportation systems.
- Developing company IP, patent filing and publications
- Head of R&D department, daily managerial function of team of engineers, scientists, software and hardware skills and knowhow.
- Developed aspiration and detection equipments for screening of marine and air cargo containers for many threat substances like explosives, narcotics, contraband tobacco, contraband food items and detection of illegal immigrants in marine containers.
- Bringing to TSI new sensor technologies, combination of sensors for added value to new products and increase reliability and market applications.

- Innovative research in many areas of sample pre-concentration, selective chemical coatings, Nano-technology for efficient and compact sub-systems.
- Novel design of miniature and cost effective ion-mobility detectors for many applications dealing with security markets, human exposure and air quality control.
- Exploring miniature mass spectrometer technology for field application and collaborative work with other US and International companies working in developing the next generation of field portable detectors. IMS-MS interfacing and analysis.
- Managerial function including budgeting, allocation of resources, applied for government funding and opportunities to work with various security agencies in responding to their technology needs, improvement to existing instrumentation, consumable market and upgrading existing screening equipments for cost saving and reliable performance.
- Innovative in chemical synthesis, development of inert simulants of explosives and testing kits for airport screening equipments.
- Development of new portable hand held detectors and radiation monitor.
- Developed novel non-radioactive ionization sources for IMS based instrumentation
- Thin films solid phase micro-extraction technologies and application for sample enrichment and analysis.

smiths

Smiths Detection, Toronto, Ontario **1997-2007**

Senior Research Scientist/ Head of New Technology Division

- Supervised new product development and application of ion mobility spectrometry(IMS, Trade mark IonScan)for analysis of explosives, drugs, chemicals, pharmaceutical drugs, chemical warfare agents and biological treat substances, environmental applications and diagnostic chemical analysis.
- Researched and developed gas chromatography-IMS applications in soil, water and air analysis for pesticides, pheromones, buried explosives and forensic applications.
- Developed various ionization methods for interfacing to IMS such as non-radioactive source, corona discharge, electro spray ionization, MALDI (in collaboration with Waterloo U), surface ionization, thermionic ionization, micro machine soft ionization membrane, and photoionization.
- Explored desorption electro spray ionization (DESI) for analysis and ionization of traces of explosives and narcotics from surfaces.
- Lasers desorption/ ionization as a non-contact method for surfaces analysis.
- Conducted research activities in the development and commercialization of hand-held explosives, narcotics and CW agents based on miniature IMS devices.
- Designed application of atmospheric chemical ionization IMS for rapid analysis of clinical compounds of interest to the pharmaceutical and medical labs industries.
- Developed analytical methods for sample preparation, concentration, cleaning and processing. Researched program with Waterloo University for development of membrane extraction sorbent interface (MESI) and Solid phase micro-extraction (SPME) technologies in various military, environmental and chemical monitoring applications.

- Created method development and deployment of IMS technology in cleaning validation and content uniformity markets.
- Researched and developed a walkthrough explosives/ narcotic detection system and dual IMS
- Detection systems Interfacing of IMS to MS
- Investigated non-IMS technologies for security market and non-security markets
- Invented a finger scanner for trace explosives and narcotics that is providing rapid analysis of residues found on fingers of drug users and terrorists. Invention can be used for screening large number of passengers in a subway station or other transportation system

University of Waterloo, Waterloo, Ontario **Started 2005**

Adjunct Professor of Chemistry

- Conducted joint research at University of Waterloo, supervised Ph.D. And Masters level students in chemistry. Joint publications on research done at UW and TSI.

Scintrex Limited, Concord, Ontario **1986-1997**

Senior Research Scientist/ Head of Chemical Detection Division

- Developed instrumentation for explosives, narcotics, sulphur gases and other market applications
- Developed portables GC-ECD detectors model EVD-1, EVD-1DC and EVD-8000, for analysis of explosives and torpedo fuel vapour detector for the military model tvd-1. All detectors became commercial and brought in substantial revenues to the company.
- Designed and developed a fast GC-NPD and GC-surface ionization detector model TND-1000 for detection of illicit drugs.
- Introduces the first surface ionization-IMS detector model NDS-2000 in a portable unit for detection of narcotics
- Developed a portable hand-held explosive detector EVD-3000 based on pyrolysis and electrochemical detection. Approximately, 5000 units were sold since 1997. Company shares jumped from $ 2.99 to $23.00 when the instruments was first introduced to the market
- Conducted studies on explosive migration in soils and environmental effects on availability of vapours at the surface of the soil under contract with Canadian military for the purpose of detecting buried plastic, non-metallic landmines.
- Engineering development of nitrate and nitro-containing compounds detection system based on pyrolysis-chemiluminescence method
- Developed a rapid explosive detection system for screening passengers and their luggage in an airport security gate, which included X-ray(System II) with explosives sampling/extraction and detection systems
- Development of theGC-sulfur specific detector for monitoring odorants in natural gas, model OVD-229

- Developed non-invasive diagnostic detector for breath analysis, focusing on hepatitis A.B.C. Breath analysis can be a powerful tool in diagnosis of various diseases

MDS/Sciex Toronto, Ontario **1978-1983**

Research Scientist

- Responsible for R& D and applications of the APCI-mass spectrometer, model TAGA 2000, TAGA 3000 and MS/MS model TAGA 6000. These units became the next generation API systems sold to the pharmaceutical industry.
- Developed sampling methodologies and concentration of explosives, narcotics and environmental pollutants
- Ran the mobile TAGA systems for analysis of fugitive emissions of organic gases, stack analysis, analysis of PCB'S, PAH's and dioxin in various matrices.
- Major contribution in screening and save evacuation of 250,000 people of Mississauga during the train derailment of propane/chlorine tanks.

Other Relevant Experience

York University Toronto, Ontario **1977-1978**

- Conducted research at the department of chemistry, under Professor A.B.P.Lever. Synthesis of phthalocyanine complexes for capturing and converting solar energy into power.

Research Interest (1978-2017)

- Intelligent analytical instrumentation, multi-sensors platform, miniature sensors, based on IMS or non-IMS technology
- Compact GC-IMS for portable field operation
- Improvement of IMS signal-to–noise ratio and ways to extend IMS dynamic range
- Successful development of cost effective explosives and narcotics detectors, with multi-sensor approach
- Development of cost effective, IMS-MS system for security and life science markets
- Development of MESI, SPME and other sampling and pre-concentration methods with hand-held detectors for field portable analysis
- Synthesis of explosives for laboratory use. Development of procedures and techniques of canine training tools involving stimulants of explosives.
- Development of stimulants for assisting security personnel in screening of carry-on luggage involving imaging techniques.
- Development of solid phase micro-extraction techniques using Nano-carbon films.
- Research area in development of novel lubricant technology for the automobile industry.
- Research and development of formulation for oil recovery from wells and tar sands.

- Development of novel explosives and narcotics stimulants for X-ray based instrumentation and canine training.

Teaching Interest

- Analytical chemistry presented in instrumentation analysis lectures based on ion mobility spectrometry and mass spectrometry. Invited speaker at Department of Chemistry, Waterloo University. Invited lecture at Ryerson University. Invited speaker at mass spectrometry Group.

PROFESSIONAL AFFILIATIONS MEMEBERSHIPS

. Association of the Chemical Profession of Ontario
. Canadian Spectroscopy Society
. Canadian Society of Mass Spectrometry
. Society of Chemical Engineering of Ontario
. American Chemical Society

PUBLICATIONS

1) S. Nacson, A. Grigoriev, M. Guan, D. Yeh. Onsite fast and slow GC-IMS analysis of explosives. 12th International Symposium on the Analysis and Detection of Explosives. Keble College. Oxford. 17-21, Sept 2017.
2) S. Nacson, A. Grigoriev. Transport and migration of explosive traces through airborne dust particles. 12th International Symposium on the Analysis and Detection of Explosives. Keble College. Oxford. 17-21, Sept 2017.
3) S.Nacson, D. Greenberg, A. Grigoriev, M. Guan, D. Yeh. Development of particle method in marine and air cargo containe5rs for testing explosives and narcotics detection system. 9th Annual Workshop on Trace Explosives Detection. Sante Fe, New Mexico, April 24-28, 2017.
4) A. A. Faust ; S. Nacson ; B. Koffler ; É. Bourbeau ; L. Gagne ; R. Laing ; C. J. Anderson, Design and validation of inert homemade explosive simulants for X-ray-based inspection systems. *Proc. SPIE* 9073, Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) Sensing XV, 90730V, May 29, 2014; doi:10.1117/12.2058035.
5) S. Nacson, A. Grigoriev, A. Bai. 6th Annual Workshop on Trace Explosives Detection, April 7-11, 2014 Charlottesville, VA. Aspiration and trace chemical Detection Equipments for Air Cargo Screening.
6) S. Nacson, 5th Annual Workshop on Trace Explosives Detection, April 8-12, 2013 Philadelphia, PA. Trace Chemical Detection of Threat Substances & Contraband Food items in Marine Containers.
7) S. Nacson, A. Grigoriev, Enviro-Analysis 2013, held in Toronto Sept 15-18, 2013 Session on Environmental Forensic. High Volume Sampling & Trace Chemical Detection of Environmental Vapors and Airborne Particles.
8) S. Nacson, 4th Annual Workshop on Trace Explosives Detection, Boston, MA, April 16-20, 2012. Particles and vapor sampling of explosives in vehicles, pallets and ULD-3 air cargo container.
9) S. Nacson Effect of Atmospheric Nitrate on the detection of explosives 3rd Worshop on Trace Explosives Detection, Portland, Oregon, April 11, 2011.

10) S. Nacson, 2nd Annual Workshop on Trace Explosives Detection, Baltimore, Maryland, April 26-30, 2010. Past experiences with sampling cargo containers and vapor/particle pre-concentration.
11) S. Nacson Past experiences with sampling Cargo containers and vapour/particle pre-concentration of trace sampling Worksop TSL, Atlantic City, NJ, Nov.18-19, 2008.
12) Y. Wang, S. Nacson, J. Pawliszyn. The Coupling of solid-desorption Microextraction/ Surface enhanced laser desorption/ionization to ion mobility spectrometry for drug analysis. Analytical Chimica Acta 582, 2007 50-54.
13) G.Eustatiu, A.Grigoriev, S. Nacson, B. Stott. International Society of ion mobility spectrometry (SIMS) 2005, France."Dual Ion Mobility Spectrometer for detection of pharmaceuticals, illicit drugs and explosives.
14) S. Nacson. B.Scott, A.Grigoriev, ISIMS 2004, Field application of membrane extraction sorbent-interface IMS for analysis of pheromones
15) Y. Wang, J. Pawliszyn, B. Thompson, M. Walles, S.Nacson. Pittconf. March 7-12, 2004, Chicago, IL#3100-500
16) S.Nacson, EnviroAnalysis 2004,The fifth biennial Int. Conf. on monitoring and measurement of the environment, Toronto, May 17-20, 2004
17) S.Nacson, Pittconf. 2004, Ion mobility spectrometry as field analytical instrument, March 7-12, 2004, Chicago, IL#8000-300
18) Y.Wang, M.Walles, Thompson, S.Nacson, J.Pawliszyn. Rapid communication in mass spectrometry 2004, 18(2), 157-162. Solid phase micro extraction combined with surface-enhanced laser desorption/ ionization introduction for ion mobility spectrometry and mass spectrometry using polypyrrole coatings.
19) S.Nacson, Greenberg, A.Grigoriev, R. James, P.Lynds. Proceedings of the 8th Int. Symp. On the analysis and detection of explosives, June 6-10, 2004, Ottawa, Canada, pp.55-68. A novel solid-phase desorption/gas chromatography/ion mobility spectrometry for the analysis of high volume sampling of explosives and narcotics in cargo containers.
20) S. Nacson, A.Grigoriev, F.Kuja, R.Debono. Proceedings of the fourth Biennial Int.conf.on monitoring and measurement of the environment, Toronto, May 27-30, 2002. Analysis of ionic liquids by IMS,pp513
21) S. Nacson, A. Grigoriev, F. Kuja. same as 8.Analysis of drug effluents in Pharmaceutical Waste Water, pp.515
22) H.Tong, N.Sze, B. Thomson, S. Nacson, Pawliszyn. Pittcon.2002, March 17-22, 2002, New Orleans, LA. Solid phase micro extraction coupled to matrix assisted laser desorption/ ionization for bimolecular detection
23) Y.Wang, M.Walles, B.Thompson, S. Nacson, J. Pawliszyn, Analyst 127, 2002, 1207
24) S.Nacson. Ion mobility spectrometry for cleaning verification. Calibration and validation Group, 2002, Annual Symp. Sept 19,2002
25) S. Nacson, F. Kuja, A. Grigoriev, R. Debono. Proceedings of the 7th Int. Symp. On the analysis and detection of explosives, June 25-28, 2001 Edinburg, Scotland pp179-191, Ion mobility spectrometry in the detection of improvised explosives
26) S. Nacson, F. Kuja, A. Grigoriev, A. Loveless, R. Jackson, R. James. Proceedings of the 7th int. Symp. On the analysis and detection of explosives, June 25-28, 2001, Edinburgh, Scotland, pp. 127-134, Application of GC-Ions can for the determination and identification of explosives in post-blast samples
27) S. Nacson, L.Fricano, L. May, F. Kuja, M. Grodzinowski. Same as 13, pp.57-59. Walkthrough portal for trace detection of explosives vapours and particles

28) S. Nacson, R. Debono, A.Grigoriev, F. Kuja. The 47th Inf. Conf on analytical sciences and spectroscopy, Toronto, Aug 19-22, 2001.APCI-ion mobility spectrometry for rapid analysis of pharmaceutical Compounds.
29) S. Nacson, R. Debono, T.Le, S. Yin, A. Grigoriev, R.Jackson, R.James, F.Kuja, A.Loveless. 9th Int. Conf. on IMS, Aug.13-16, 2000, Halifax, Nova Scotia, Canada.
Rapid analysis of pesticides on imported fruits by GC-lonscan
30) S. Nacson, L.Fricano, M.Goledzinowski, F. Kuja, l.May, M.Uffe. Same as 15. A novel portal design for rapid real-time detection of explosive vapours and particles.
31) S.Nacson, R.Debono, F. Kuja, L.May, R. Jacson. R. James. SPIE conference, Enforcement and Security Technology reviews, Nov, 1998, Boston, Massachusetts. Advancements in field portable ion mobility spectrometry for trace drug and explosive detection.
32) S. Nacson, R.Jackson, R. Debono, R. James, F. Kuja, A. Loveless. 7th Conference on Ion mobility spectrometry, U.K. 1998
33)) S. Nacson, F. Kuja, R. Debono, Pittconf. March 1998, New Orleans
34)) S. Nacson, H. Walker, A. Chang, T. Siu, L. McNelles, M. Uffe.SPIE, Vol.2937, 1997. Portable instrument for detection of illicit drugs
35) S. Nacson, L.McNelles, S. Nargolwalla, D. Greenberg. Proceeding of the second explosives detection technology symposium and aviation security technology conference. Nov 12-15, 1996. Method of detecting taggants in plastic explosives, airport trials and solubility of explosives
36) S. Nacson.5th Int. Symp. On the analysis and detection of explosives, Dec4-8, 1995. Adsorption Phenomena in explosive detection
37) S. Nacson, D. Greenberg, S. Nargolwall, L. Mc Nelles. 3th Worksop of ICAO AD HOC Group of Specialists on detection of explosives, FAA Atlantic City, Oct 1995. Detection of explosives in mail bags with the explosives detector model EVD-3000.
38) S.Nacson, O. Legrady, T. Siu, D. Greenberg, S. Nargolwalla. SPIE Proceedings Vol. 2276. Cargo Inspection Technology Conference, San Diego, July1994.Improved and Novel approaches of explosives.
39) S. Nacson, O.Legrady, T.Siu. Proceedings Int. Symp. Contraband Cargo Inspection Technology, Washington DC, Oct 28-30, 1992. GC approach to detection of narcotics
40) S.Nacson, O. Legrady, T. Siu, S. Nargowalla. Proceedings of 1st Int. Symp.On Explosives Detection Technology, FAA Technical Centre, Atlantic City, 1992, pp714, GC-ECD method for detection of explosives and taggants.
41) S. Nacson, C. Castledine, O. Legrady, T.Siu. Proceedings Canadian Elect. & Comp. Eng, Ottawa, Sept.1990. Explosives detection system for airport security, GC based devices
42) S. Nacson, S.Nargolwalla,I. Krynicki, J.P.Gelbewicz.Ultrasensitive Portable EGDN vapour detector, ICC/CID Symp. Saskatoon, 1986.
43) S.Nacson, Creation of libraries for quadrupole Tandem mass spectrometers, 31st Ann. Conf.Mass. Spect. Boston May 1983.
44) N.H. Higazi andS.Nacson. Identification of air pollutants from landfill sites, Real-time qualitative and quantitative measurements of fugitive emissions. Pittconf.1982
45) S. Nacson, Greenberg, S. Nargolwalla, J. P.Geblewicz. Portable Explosive Vapour detector for N-based explosive. Congre. Adv. Spect & Lab Science, Toronto, Oct,6, 1986
46) S. Nacson and A.G.Harrison, Dependence of Secondary H/D Isotope Effects on Internal Energy. Org. Mass Spect. 20, 429, 1985
47) S. Nacson, A.G.Harrison. Energy-dependent fragmentation of the p-ethyl toluene molecular ion. Ibid, 21309, 1986

48) S. Nacson, A.G.Harrison, W.R.Davidson. Effect on method of ion preparation on low energy collision induced dissociation mass spectrometry. Ibid, 21317, 1986
49) B.Shushan, L.E.Fulford, B.A. Thompson, W. Davidson, A.Ngo, S. Nacson. Recent applications of triple quadruple mass spectrometer. Int.J. Mass Spec. Ion Proc.46, 225, 1983
50) S. Nacson, J.J.Swinzelman and A.G.Harrison. Comparison of charge-Exchange energy resolved and angle resolved mass spectrometry. Methods for studying the energy dependence of ion fragmentation reactions. Inter. J.of Mass. Spect. Ion Proc. 67, 93-108, 1985
51) S.Nacson, A.G.Harrison. Energy transfer in collision activation energy. Dependence of the fragmentation of n-alkylbenzene molecular ions. Int.J.Mass, Spect. Ion Proc 63, 325-337, 1985
52) A.G.Harrison, S. Nacson, A.Mandelbaum. Energy-resolved study of the Fragmentation of esters of maleic and fumaric acids. Org. Mass. Spect. Vol.22, 283-288, 1987
53) W.R.Davidson, A.W, Lovett, S. Nacson, A. Ngo, F.M.Benoit, J. Anal.Chem.55, 807, 1983. Breath Analysis by atmospheric pressure ionization mass spectrometry.
54) L.V.S.Hood, W.R.Davidson, S.Nacson. Use of APCI Mass Spectrometer in detection of illicit drugs. 29th, Ann. Conf. Mass Spect. Minneapolis, 1981.
55) S.Nacson. Evaluation of passive dosimeters for PCB collection. Ann. CID Conf. Halifax,1981
56) B.A.Thompson, D.A.Lane, T.Sakuma, N.M.Reid, J.B.French, S.Nacson. Extending the capabilities of an A-PCI-mass spectrometer system for the Rapid ultra-trace detection of PCBs and hexachlorobenzene in the Atmosphere. 27th Ann.Conf. Mass Spect.Seattle, June 1979
57) U.S. Patent #5,395,589, inventor S.Nacson Apparatus for rapid and specific detection of organic vapours, issued March 7,1995
58) U.S.Patent # 5,426,056, inventor S. Nacson Surface ionization detection for detecting trace amount of organic Molecules, issued June 20,1995
59) U.S.Patent # 6,446,514. S.Nacson, combined particle/vapour sampler,2002
60) U.S. Patent #6, 619,143. S.Nacson, Combine particle/vapour sample, 2003
61) U.S. Patent pending 20050127286A1, June 16, 2005.Method and system for introducing an analysis into an ion mobility spectrometer.
62) U.S. Patent pending on alternative CI chemistry for detection of TATP, applied June 2005
63) U.S. Patent pending on ticket screening System, Jan 2005
64) U.S. Patent 6,903,725 B2 on IMS in cleaning Validation
65) S.Nacson Article scanner U.S Patent 7,458,283
66) S.Nacson, Sampling device US Patent 7,421,912
67) S.Nacson, Sample and desorber unit for detection of drugs and explosives particles, Canadian Patent CA-2129594
68) S.Nacson, Method and system for introducing an analyse ion into an IMS US Patent No. 7,129,479
69) S.Nacson, Self-powered cordless mouse 6,903,725
70) S.Nacson, Dual IMS WO/2007089221, 500DT instrument
71) S.Nacson, Non-invasive Method and system for screening the content & containers of the presence of treat substances US Patent number 8,220,312 B2, July 17, 2012.
72) S.Nacson, Non-invasive Method and apparatus for pending the presence of illicit substances, US Patent number 9,213,123, Dec 15, 2015.
73) S. Nacson, Method for Extraction and Recovery of Oils from Old Wells and from Tar Sands. Canadian Patent 2,789,917 (2012). US patent 9,169,545.

74) S.Nacson, Lubricant oil formulation, Canadian Patent 2,787,368. US patent 9,169,454.
75) S.Nacson, Transportable Portal for Detection of illicit substances. Canadian Patent 2,756,199, Oct 2011. US Patent number 9,063,100 June 23, 2015.
76) S.Nacson, A.Crnatovic, G,Wiseman. Substances Detection system and method. US patent 9,170,232 Oct 27, 2015.
77) S.Nacson, A. Crnatovic, G.Wiseman, Substances Detection system and Method. US patent 9,541,525, Jan 10, 2017.
78) S.Nacson, A. Crnatovic, G.Wiseman, Threat substances detection system. Chinese patent ZL 201310150942.3. Granted Nov 3, 2017.
79) S.Nacson. Aircraft screening device and method. US patent 9,329,156. May 3, 2016.
80) S.Nacson. Silver Recognition, Humanity in Science Award. Analytica Scientist 2016. Presented at Analytica in Munich May 10, 2016.