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OBITUARY

Tributes

Bruce R. Locke[1]

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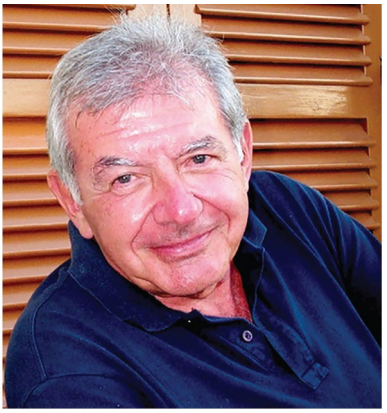
Tribute to Professor Riccardo d'Agostino



Professor Riccardo d'Agostino (June 17, 1942–April 21, 2018)

Riccardo d'Agostino, Professor Emeritus of General Chemistry at the University of Bari "Aldo Moro" (Italy), left us on April 21st, 2018, at the age of 75 after an unfair battle against cancer. With Riccardo d'Agostino's passing, the plasma community loses one of its pre-eminent members, a fine scientist, a committed organizer, a passionate communicator and a true gentleman.

In 1968 Riccardo completed his Chemistry "Laurea" at the University of Bari, with a thesis on coordination complexes under the supervision of Prof. Ettore Molinari, who founded in Bari, Italy's first research group on Plasma Chemistry, and hired Riccardo as a research assistant. Early research was split between coordination complexes and plasma chemistry, kinetics being the leitmotiv of Riccardo's activity. 1973 was a crucial year in Riccardo's life, since he joined for 1 year the group of Prof. John C. Polany in Toronto (Canada), 1986 Nobel Prize winner in Chemistry, working on fundamental kinetics of atom/molecule−surface interactions. When he returned to Italy he studied plasma-induced synthesis, cracking and oxidation of various gases, and thereby became

✉ Bruce R. Locke
locke@eng.famu.fsu.edu

[1] Florida State University, Tallahassee, USA

more and more committed to fundamental and applied investigations of plasma-surface interactions. In 1975 Riccardo became Associate Professor of General Inorganic Chemistry and he started the cooperation with the group of Daniel L Flamm at Bell Laboratories (USA), working on plasma etching mechanisms of Si and SiO_2. Then he turned to diagnostics of plasma etching using "actinometry", contributing to the development of this technique, after it was first introduced by J.W. Coburn. From the early 1980s onward, Riccardo published many papers on homogeneous and heterogeneous mechanisms in low pressure discharges and started working on the deposition of "Teflon-like" fluoropolymer coatings. In 1986 Riccardo was promoted to Full Professor of General Inorganic Chemistry and in 1990 he edited the first of his four books, certainly the most important, namely Plasma Deposition, Treatment and Etching of Polymers, with contributions from several eminent foreign colleagues. The period that followed was the most productive for d'Agostino and his team, because he was able to establish many collaborations, to attract funds from National and European agencies as well as from industry, and he published an impressive number of papers and some patents. These covered etching processes (Al, Si, SiO_2, Ti, W, GaAs, etc.), plasma-deposited coatings (Teflon-like, organo-silicone and silica-like, nanocomposite, PolyEthyleneOxide (PEO)- like coatings, etc.), plasma-modified surfaces, and applications (gas/vapor barrier, super-hydrophobicity, corrosion protection, biomedical, non-fouling, bactericidal coatings, etc.). Later, several of them, previously formulated for low pressure, would also be developed by the d'Agostino team for operation at atmospheric pressure. In 2004 Riccardo founded Plasma Solution srl, one the first academic spin-off companies in Italy. That same year he started Plasma Processes and Polymers (WILEY–VCH), as co-Editor-in-Chief together with Michael R. Wertheimer, Christian Oehr and Pietro Favia. Beside all of the above-described activities, which continued well beyond Riccardo's retirement in 2012, he organized numerous scientific events, all very memorable according to accounts of the many participants, for their high scientific quality and for the friendly atmosphere. Among those many conferences and summer schools, it is worth to remember the International Symposium on Plasma Chemistry (ISPC) in 1989 (Pugnochiuso, Italy) and 2003 (Taormina, Italy); the NATO-ASI School on Plasma Processing of Polymers in 1996 (Acquafredda di Maratea, Italy), and the many ISPC Schools on low temperature plasmas from 1989 to 2005. Riccardo's leadership qualities resulted in several important appointments: in 1989–1991 he was elected Chair of the IUPAC Committee for Plasma Chemistry; in 1994–1996 and 2001–2003 he acted as Chair of the Department of Chemistry at the University of Bari. During his long career, Riccardo was awarded several prizes. Among those, he was particularly proud of the Plasma Chemistry Award that was presented to him at the ISPC in 2007 (Kyoto, Japan). Indeed, we would like to end this obituary with the brief text reported on the plaque of this Award, words that we wholeheartedly endorse: Highly respected, brilliant member of our Plasma Science Community, Riccardo d'Agostino will forever remain in our memories for his passion, his deep knowledge, his elegance, his generosity and his gentle demeanor.

Pietro Favia, University of Bari (corresponding author)
pietro.favia@uniba.it
Francesco Fracassi, University of Bari
francesco.fracassi@uniba.it

Tribute to Professor Max Goldman

Max Goldman (1931–2017)

Dr. Max Goldman rests in peace in the hills near Jerusalem. He passed away on August 13th 2017. Max was born in 1931 in a small French city close to the German border and he wasn't spared by the war. To save his life during World War 2, he went from farm to farm by his own means, taking care of pigs and living with them.

He started his career at the French national defense board and at the CEA ("Commissariat à l'Energie Atomique"), and thus rapidly joined the CNRS, the French National Board for Scientific Research, where he defended his PhD on vacuum discharges applied to the development of a new flash radiography bulb. Louis De Broglie was a jury member for his dissertation.

In the early 1960s, he joined, as co-director, the "Laboratoire de Synthèse Atomique et d'Optique Protonique" first created by Frédéric Joliot-Curie in 1937 as the "Laboratoire de Synthèse Atomique (LSA)". Starting with detection of high energy particles, Max initiated the first studies on corona discharges using fast imaging cameras.

In 1970, he created the "Laboratoire de Physique des Décharges", associated with the Engineering School "Ecole Supérieure d'Electricité" (Supélec). This Laboratory, which was considered the leading French research group in this field for many years, and it merged with the "Laboratoire de Physique des Gaz et des Plasmas" in 1996.

During his career, Max extensively studied various forms of electrical discharges, focusing on the fundamental mechanisms leading to their initiation and development in time and space, but also on their physical and chemical properties. He gave special attention to applications. One can cite insulation defaults (aging and breakdown), the active lightning rod, surface treatment, and ozone production as key areas where he made significant contributions.

Long term collaborations were established with Reidar Svein Sigmond (The Norwegian Institute of Technology, Trondheim, Norway) and Jacques Amouroux (Sorbonne University, Paris, France) which resulted in fundamental insights in the fields of corona discharge physics and plasma chemistry, respectively.

Max was very concerned with interdisciplinary approaches, and it is worth noting that he initiated several pioneering works which are still under investigation/development in most of

our laboratories, and are of interest for ISNTPT: gas treatment (VOC abatement), aerosol production/filtration, and surface sterilization.

Other scientists who worked closely with Max include Robert Haug, Gildas Hartmann, Gérard Berger, Emmanuel Marode, Roland Coelho, Michel Lecuiller, and later on, Philippe Molinié, Jean-Pascal Borra, Emmanuel Odic, Faranghi Kiani, and Farzi Arefi.

Max was a Member of the Norwegian academy of Science. He authored many journal and conference papers, held many patents, participated in and directed several academic societies. He also developed strong cooperation with major French industrial groups such as EDF, Schneider Electric, Rhône-Poulenc, and others.

Max had a fighting (but peaceful) spirit. He never missed an opportunity to take up a challenge in several fields. Of course in science, but also in sport; he practiced martial arts at a high level, and most of us played the role of guinea pig in numerous demonstrations.

Evoking Max's career and memory is impossible without mentioning his wife, Alice Goldman, who shared his personal and professional life. Alice, who was a Research Engineer at CNRS, brought major contributions to plasma physics in collaboration with Max but also on her own.

Finally, Max transferred scientific knowledge to his colleagues and students, and also his passion for science. Thank you, Max.

Alice Goldman
malicegoldman@free.fr
Jacques Amouroux
jacques.amouroux@u-psud.fr
Emmanuel Marode
emmanuel.marode@u-psud.fr
Gérard Touchard, University of Poitiers (corresponding author)
touchard@univ-poitiers.fr
Jean-Pascal Borra
jean-pascal.borra@u-psud.fr
Philippe Molinié
philippe.molinie@centralesupelec.fr
Michael Kirkpatrick, Supelec
mike.kirkpatrick@centralesupelec.fr
Emmanuel Odic, Supelec
emmanuel.odic@centralesupelec.fr

Tribute to Dr. Pavel Šunka

Dr. Pavel Šunka (1936–2017)

Our dear colleague and mentor Dr. Pavel Šunka passed away in the summer of 2017. He was a frequent and key contributor to the ISNTPT.

Pavel was born June 24, 1936 in Velká Roudka, part of the village of Jevíčko in Moravská Třebová district (Moravia, Czechoslovakia). He attended the Czech Technical University Department of Electrical Engineering in Prague where he earned his BS in Radio Engineering in 1960. He joined the Institute of Plasma Physics (IPP), Czechoslovak Academy of Sciences, which had recently been established by the efforts of Professor Miloš Seidl following the Geneva Conference dedicated to controlled thermonuclear fusion. In 1964 he was one of first three foreign interns at IEA Kurchatov, Moscow, at that time the world's premier thermonuclear research center, and in 1968 he earned his PhD in Experimental Plasma Physics from the Czechoslovak Academy of Sciences.

Pavel spent his entire career from 1960 to 2017 at the Institute of Plasma Physics in Prague. In the early 1960s his work was devoted to electron accelerators which was followed by research in plasma generation and heating by non-relativistic electron beams in magnetic fields and the study of beam plasma instabilities. As part of the Prague Beam School he experimentally confirmed the theoretically predicted spectra of beam instabilities. He also developed large pulse power technology for generation of high current electron beams (500 keV, 50 kA, 100 ns).

Pavel was one of the early investigators of the environmental and medical applications of plasma. Encouraged by Dr. Jiří Beneš, he directed his plasma research to liquids. During the period 1985–1990 he studied the properties of shock waves generated in water with heavy current sparks and he led the development of a unique discharge circuit to generate focused shock waves in water for extra-corporeal shock wave lithotripsy of kidney stones. This work resulted in the MEDILIT system which has been used since 1991 in 20 hospitals in the Czech Republic and Slovakia to treat 150,000 patients. This lithotripsy process requires only a light analgesia and has even saved some lives. His work was "Plasma Medicine" before the term was introduced. During the period from 1993 to 2017 he directed research on electrical discharges in gases at atmospheric pressure and in liquids, and

further studies on the applications of focused shock waves in medicine. He patented a composite electrode system where cylindrical acoustic waves are generated by multichannel discharges and then focused with a parabolic reflector. This system allows application of two shock waves over several microseconds, which in principle can allow targeted intrusion even into soft homogeneous tissues. Up to the end of his career and even during his partial retirement he was passionate about the medical applications of this technology.

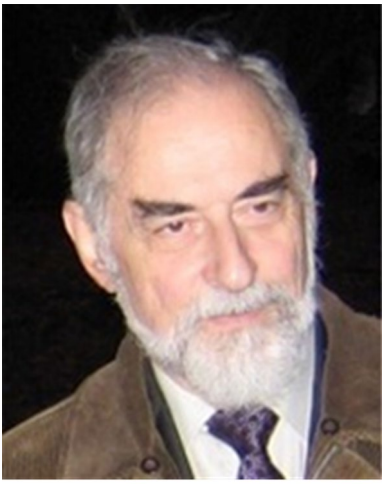
Pavel was also a very successful and admired administrator and educator, serving as Head of the Department of Pulsed Plasma Systems, Institute of Plasma Physics, Czech Academy of Sciences from 1990 to 2001 and Director of Institute of Plasma Physics from 1991 to 1998. He was an affiliated Professor of Plasma Physics at Masaryk University, Brno, Czech Republic and a member of PhD committees at Charles University, Czech Technical University, and Masaryk University. He supervised 10 PhD students and was a Member of the Board of the Plasma Physics Division of the European Physical Society and 1998 Chairman of the Organizing Committee, International Congress on Plasma Physics.

He earned many honors and awards. In 1982 he shared with Karel Jungwirth and Jiří Ullschmied the Czechoslovak Academy of Sciences Award, for "work in the field of power physics bundles of charged particles". In 1986 he was awarded the Silver Medal of the Czechoslovak Academy of Sciences "for merit in development of the physical sciences contributions" due to his work on experiments with fast high-voltage switches for relativistic electron beams (REBEX). In 1999 he was awarded the Ernst Mach Medal, Czech Academy of Sciences.

Pavel's contributions and leadership in plasma applications to environmental and medical topics were groundbreaking and his legacy lives on in the students and colleagues he worked with and inspired.

Vaclav Babický, Institute of Plasma Physics
babicky@ipp.cas.cz
Martin Člupek, Institute of Plasma Physics
clupek@ipp.cas.cz
Petr Lukeš, Institute of Plasma Physics (corresponding author)
lukes@ipp.cas.cz
Bruce R. Locke, Florida State University
locke@eng.famu.fsu.edu

Tribute to Professor Jean-Louis Brisset



Professor Jean-Louis Brisset (1940–2016)

On March 31st, 2016, the non-thermal plasma community lost a visionary, respected scientist and a great friend in Professor Jean-Louis Brisset.

His academic career began after university studies in Paris (Université Pierre et Marie Curie, (UPMC), Electrochemistry in l'Ecole Nationale Supérieure de Chimie) with his PhD (1973) devoted to the "Physico-chemical properties of aqueous/organic solvent mixtures". He was then appointed by UPMC-Paris VI as an assistant professor in Electrochemistry and Analytical Chemistry. In 1990 he was awarded a professor position with Rouen University where he served as the head of the Laboratoire d'Electrochimie Interfaciale et de Chimie Analytique (LEICA), while conducting research on the chemical properties of non thermal plasma (in particular the oxidation–reduction properties of excited species), focusing on gliding discharges and plasma-liquid interactions. He also taught solution chemistry and electrochemistry.

Professor Brisset was a multitalented person, with various interests in the applications of discharges, mainly for environmental and biological purposes. He uncovered the role of peroxynitrite formed in humid air discharges and established the role of selected active species, including:

- removing industrial organic wastes including pure waste solvents and recalcitrant molecules,
- degrading organic wastes from urban or industrial origins (e.g., tanning industry, palm oil refinery, breweries, slaughterhouse effluents, etc.),
- degrading chemical warfare agent simulants,
- bacterial inactivation and interaction of plasma activated species with living matter (including medical applications).

His closely cooperative work with Prof. Eugen Hnatiuc aimed at improving plasma reactors adapted to the treatment of liquids and gases for industrial applications. Professor Brisset was fascinated by the influence of plasma-generated active species on living matter.

His pioneering work on active species generated in discharges, especially on the formation and role of reactive nitrogen species (RNS), are still extremely important. These species are key compounds involved in the cell death process and play important roles in major diseases (e.g., cellular stress, Alzheimer's disease, HIV, etc.).

After retirement in 2006, he continued to be an active researcher as Professor Emeritus supervising PhD students from Cameroon (Yaounde I University). Professor Brisset was a great contributor to the COST European initiatives: MP1101 "Biomedical Applications of Atmospheric Pressure Plasma Technology" and TD1208 "Electrical Discharges with Liquids for Future Applications". These projects gathered scientists interested in the applications of plasma in medicine, biotechnology, environmental technology and various industrial fields. He kept close working and friendly relations with his colleagues from the plasma field not only from France but also from Romania, Algeria, Cameroon and Poland, among the others. His field of scientific activity also favored numerous industrial contacts.

Professor Brisset was an author or co-author of more than 350 scientific papers, books, patents and communications. One of his last publications was a paper published in Plasma Chemistry and Plasma Processing, entitled "Chemical Effects of Air Plasma Species on Aqueous Solutes in Direct and Delayed Exposure Modes: Discharge, Post-discharge and Plasma Activated Water". Research ideas generated by Professor Brisset have continue to be important and have had a lasting impact on our field.

Professor Jean-Louis Brisset was a man of great knowledge, broad horizons, with the ability to provide accurate remarks which have been perceptivity cherished by the non-thermal plasma community. He was also very modest, kind-hearted and a loyal friend, and a true family person. He was a great father of two children and happily married to Anne-Marie. His younger colleagues and students were very fond of him because he always encouraged them towards experimental work and supported their enthusiasm with excellent scientific advice.

In spite of an enduring long-term illness, Professor Brisset was extremely positive and treated it lightly. Until his last moments, he worked on a book related to the chemical effects of plasmas in contact with liquids.

I personally lost great a mentor and friend, and our community lost a great scientist. We miss him deeply.

Joanna Pawlat, Politechnika Lubelska
askmik@hotmail.com

I would like to express my gratitude to Anne-Marie, Hélène and Claire Brisset for their great help and to Prof. Bruce R. Locke for supporting all actions towards the preservation of our dear friend's memory.