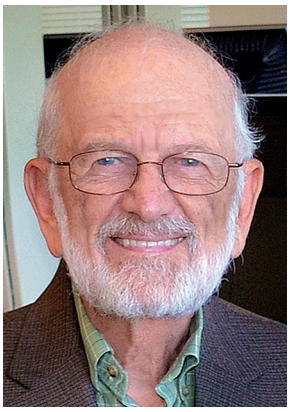

R. G. Cooks

*The author presented on this page has recently published his **25th article** since 2000 in Angewandte Chemie:* "On-Demand Ambient Ionization of Picoliter Samples Using Charge Pulses": A. Li, A. Hollerbach, Q. Luo, R. G. Cooks, *Angew. Chem. Int. Ed.* **2015**, *54*, 6893; *Angew. Chem.* **2015**, *127*, 6997.

R. Graham Cooks

Date of birth:	July 2, 1941
Position:	Henry Bohn Hass Distinguished Professor of Chemistry, Purdue University
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Education:	1961 BSc, University of Natal, South Africa 1965 PhD with Frank L. Warren, University of Natal 1967 PhD with Peter Sykes, University of Cambridge 1967–1969 Postdoctoral research with Dudley H. Williams, University of Cambridge
Awards:	**2009** Robert Boyle Medal, Royal Society of Chemistry; **2010** Fellow, American Academy of Arts and Science; **2011** Fellow, American Association for the Advancement of Science; **2011** Centenary Prize, Royal Society of Chemistry; **2013** Camille & Henry Dreyfus Prize in the Chemical Sciences; **2014** Nobel Laureate Signature Award for Graduate Education in Chemistry (preceptor), American Chemical Society; **2014** Fellow, National Academy of Inventors; **2015** Member, US National Academy of Sciences
Current research interests:	1) Mass spectrometry (MS) in air: ionization (ambient ionization), ion focusing, ion/molecule reactions; ion separation and detection. 2) MS for the milligram-scale synthesis of organic compounds and nanomaterials. 3) MS for disease diagnosis, especially intrasurgical brain and kidney tumor detection and typing. 4) Point-of-care clinical chemistry using miniature mass spectrometers.
Hobbies:	Literature, especially 19th century; gardening, in particular flowers

My favorite food is "i"-food: Italian, Indian, Indonesian.

My favorite music is Wagnerian, especially *Parsifal*.

My favorite author (fiction) is José Saramago, the Nobel Laureate and unrepentant socialist, for his wit, style, and wisdom in *The History of the Siege of Lisbon*, *Baltasar and Blimunda*, and *The Year of the Death of Ricardo Reis*.

The downside of my job is on-line training exercises, budget forms, progress reporting, and other forms of bureaucratic tyranny.

In retrospect I would never again use liquid polymers in an ultrahigh vacuum system.

My favorite quote is "We have art in order not to die of the truth" (Nietzsche).

I like refereeing because every now and then, someone writes well—about a worthwhile subject.

The most significant scientific advance of the last 100 years has been measurement of ion mass/charge ratios.

The biggest problem that scientists face is public scientific illiteracy.

What I look for first in a publication is the pictures.

The most important thing I learned from my mother is the value of hard work.

If I could have dinner with some famous scientists from history, they would be Wittgenstein, Russell, and the Leakeys.

And I would ask them about symbolic logic and its long journey in the form of a meme from Australopithecus to us, and I would hope in turn that they would ask me about modern mass spectrometry.

My favorite place on earth is a beach near Umtentweni, South Africa.

I chose chemistry as a career because a career in English Literature would have spoilt that subject.

My not-so-secret passion is literature.

If I were not a scientist, I would be a writer.

My most exciting discovery to date has been that proton-bound dimers ($B^1 \cdots H^+ \cdots B^2$) give thermochemical information directly from the kinetics of their competitive fragmentations.

Angewandte International Edition Chemie

My greatest achievement has been the concept of tandem mass spectrometry for complex-mixture analysis.

The best advice I have ever been given is "people who worry about tenure don't deserve it".

If I could go back in time and do any experiment, it would be to go forward in time and repeat the experiment.

Has your approach to chemistry research changed since the start of your career?

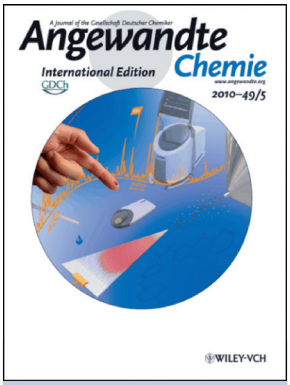
Remarkably little, actually. I still see it as an adventure. I love the element of surprise … the discovery of little gems, especially those not sought. I still dislike highly systematized approaches to chemical research—give me alchemy over "bureau-chemie" any day! Once one gets beyond the physical side (the lab bench/the instrument) the conceptual intricacy and beauty of research is wonderful. The possibility that some real good will come of such an activity is a bonus.

What advice would you give to up-and-coming scientists?

Keep doing what got you this far. Remember that all knowledge is connected. Keep some of your time and enthusiasm for things that don't increase your h-index or add to your funding, but which connect you to our common intellectual life.

My 5 top papers:

1. "Accelerated Carbon–Carbon Bond Forming Reactions in Preparative Electrospray": T. Müller, A. Badu-Tawiah, R. G. Cooks, *Angew. Chem. Int. Ed.* **2012**, *51*, 11832; *Angew. Chem.* **2012**, *124*, 12002.
   Mass spectrometry is badly named. It has little in common with other forms of spectrometry except in how the data are displayed. It is in fact the science and technology of ions. Not just gas-phase ions, but also ions in the ordinary solution phase. As such, reactions and synthesis are very much a part of mass spectrometry: not only reactions in the vapor phase but reactions in the ordinary condensed phase. This paper is one of several recent papers in which we perform synthesis on the milligram scale using electrosprayed ions.
2. "On-Line Reaction Monitoring and Mechanistic Studies by Mass Spectrometry: Negishi Cross-Coupling, Hydrogenolysis, and Reductive Amination": X. Yan, E. Sokol, X. Li, G. Li, S. Xu, R. G. Cooks, *Angew. Chem. Int. Ed.* **2014**, *53*, 5931; *Angew. Chem.* **2014**, *126*, 6041.
   Information on reaction intermediates and reaction mechanisms can be obtained by using inductive electrospray ionization. This approach is free of the clogging problems that have beset attempts to continuously monitor reactions and was applied to air- and water-sensitive reactions. Short-lived intermediates with lifetimes of a few seconds could be observed in reactions that run over a period of hours.
3. "Chiral Transmission between Amino Acids: Chirally Selective Amino Acid Substitution in the Serine Octamer as a Possible Step in Homochirogenesis": K. J. Koch, F. C. Gozzo, S. C. Nanita, Z. Takats, M. N. Eberlin, R. G. Cooks, *Angew. Chem. Int. Ed.* **2002**, *41*, 1721; *Angew. Chem.* **2002**, *114*, 1797.
   The conversion of racemic or near-racemic material into enantiomerically pure material in nature (not necessarily terrestrial nature!) is one of the great questions in chemical science. In this paper, noncovalent clusters of serine and other coding amino acids and their possible role in prebiotic chemistry are described. The key observation is serine sublimes as the homochiral octamer and this causes chiral enrichment in the sublimate.
4. "Ambient mass spectrometry for the intraoperative molecular diagnosis of human brain tumors": L. S. Eberlin et al., *Proc. Natl. Acad. Sci. USA* **2013**, *110*, 1611.
   An ambient ionization method, desorption electrospray ionization, is used to rapidly characterize tissue for tumor type and tumor-cell concentration, allowing near-real-time diagnosis and tumor-margin delineation. In our experiment, lipid profiles recorded in low-resolution mass spectra were used and this data was automatically correlated with a library of spectra of tissue samples characterized by histopathology.
5. "Soft-Landing of Polyatomic Ions at Fluorinated Self-Assembled Monolayer Surfaces" S. A. Miller, H. Luo, S. J. Pachuta, R. G. Cooks, *Science* **1997**, *275*, 1447.
   Polyatomic ions are readily generated in virtually any desired structure so the fact that they can be deposited intact on surfaces opens up a wide range of surface-modification possibilities currently being explored by several groups. The related experiment in which low-energy ions react at surfaces allows control of functional groups at surfaces. A follow-up to the soft-landing study was the recent demonstration that nanoparticles can be generated by similar deposition experiments.



The work of R. G. Cooks has been featured on the inside cover of Angewandte Chemie:
"Paper Spray for Direct Analysis of Complex Mixtures Using Mass Spectrometry": H. Wang, J. Liu, R. G. Cooks, Z. Ouyang, *Angew. Chem. Int. Ed.* **2010**, *49*, 877; *Angew. Chem.* **2010**, *122*, 889.

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