Chapter 1

One Hundred Years of Colloid Symposia

Ramanathan Nagarajan*

U. S. Army Futures Command, Combat Capabilities Development Command Soldier Center, Natick, Massachusetts 01760, United States

***Email: Ramanathan.Nagarajan.Civ@Army.Mil**

One hundred years have elapsed since the first National Colloid Symposium took place in June 1923 at the University of Wisconsin. This symposium has continued to not only exist through the Great Depression and the Second World War, but has shown consistent growth, as the scientific influence of colloid and surface science within the academia has grown and its technological importance has broadened to include wide range of industrial applications in energy, environment, agriculture, personal care products sectors, and the critical area of nanomedicine. This chapter is not intended to discuss the scientific and technical advances in the field of colloid and surface science that accompanied these national meetings and was reflected in the contents of the technical sessions within these meetings over a century. Such an article deserves to be written for a future publication. In this chapter, a brief descriptive review of the colloid symposia over the hundred years is given, colored by the personal points of view of the author who has organized five of these symposia. The evolution of these symposia from its early stable state that existed for nearly the first 50 years, characterized by 20 to 30 papers being presented in a single session, to its current form, where ten or more parallel symposia are held with 400 to 600 presentations, is traced. Key features of the symposia that came into existence over time, such as inclusion and recognition of women scientists at these symposia, enhanced presence and participation of students, the significant role assumed by symposia organizers in influencing the content of the meeting, the birth of international colloid and surface science symposia starting from these national meetings, are all touched upon. The information presented in this chapter has been gathered from meeting notices and reports that have appeared in various publications, many of them sketchy or incomplete. It is hoped that readers will point out any missing information or factual errors appearing in this chapter, to enable updating the history of this important and living scientific and professional event, the oldest among various Divisions of the American Chemical Society.

Nagarajan; One Hundred Years of Colloid Symposia: Looking Back and Looking Forward
ACS Symposium Series; American Chemical Society: Washington, DC, 0.

Introduction

June 2023 marks the centenary of the 1st National Colloid Symposium that took place at the University of Wisconsin. It is the oldest such divisional symposium within the American Chemical Society. The most recent Colloid Symposium held at the North Carolina State University in June 2023 was the 97th and not the 101st as it should have been, because the symposium was not held in 1933 impacted by the Great Depression, and for the three years during 1943-45, because of the Second World War. The sustained, practically uninterrupted continuation of this symposium over these 100 years is a remarkable indicator of the durability and strength of the colloid science community in the U.S. One measure of the stability and growth of the colloid symposia is the number of presentations that are made at each of the symposia (Figure 1).

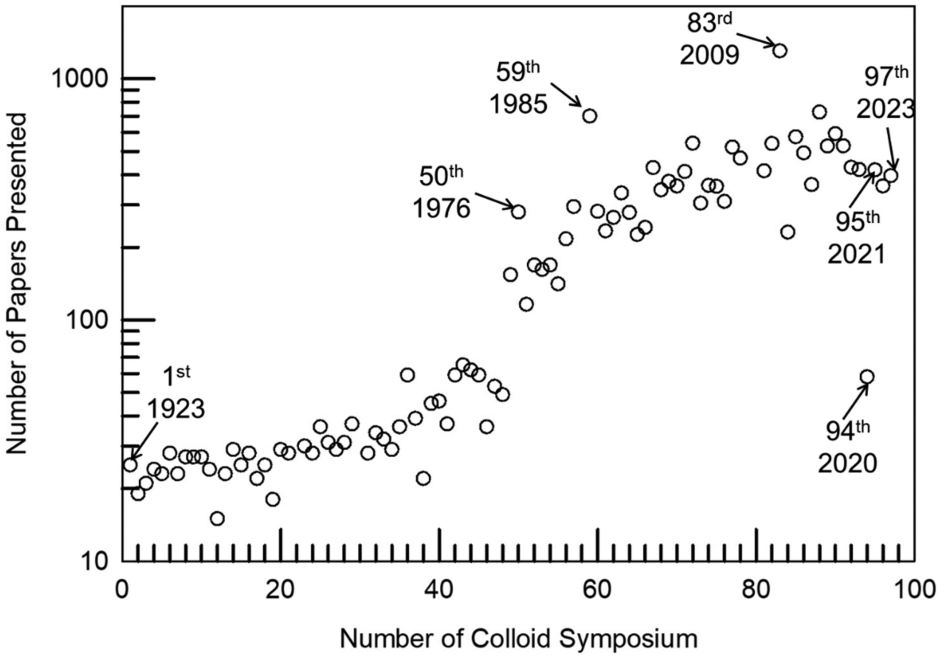

Figure 1. Number of presentations made at the colloid symposia from the 1st symposium held in 1923 to the most recent 97th symposium held in 2023. All were three-day symposia, except for the three, 50th in 1976, 59th in 1985 and 83rd in 2009 that were aligned with the five-day International Colloid and Surface Science Symposium. The 94th symposium in 2020 was virtual, necessitated by the initial virulent phase of the COVID-19 epidemic and helped shape the 95th symposium in 2021, that was also virtual.

Of the 97 symposia that have been held, I have served as the co-organizer and co-chair of five symposia in the last 25 years, twice at the Pennsylvania State University in 1988 and 1998, once at the University of Michigan in 2002 and at Harvard University in 2016 and once virtually, in 2021. This chapter is intended to provide some historical information on this enduring symposium, colored by my personal observations. The focus of this chapter is not on the developments in colloid and surface science that accompanied these symposia and were reflected in the symposium content, though it would be an interesting future undertaking. I have merely attempted to look at the colloid symposium as an event, that emerged and has endured.

I have drawn all information presented in this chapter from meeting announcements or summaries that have appeared in Chemical & Engineering News (C&EN), Industrial & Engineering Chemistry (I&EC), and Journal of Colloid and Surface Science (JCIS), for all the early years, and the meeting websites created for these symposia, in the recent years. These sources have not been cited in this article. Starting from the 43rd symposium until the 81st symposium, C&E News published the detailed meeting schedule, but ended this practice after the 81st symposium. For later meetings, local symposium organizers created program books and meeting websites, but unfortunately, they are not readily available since these websites were not archived. It will be useful if the meeting information for future colloid symposia can be archived and remain publicly accessible. Information on all 97 colloid symposia including the symposium organizer/chair, the foreign guest of honor (as in the early years of the symposia) or the plenary lecturer (foreign and domestic, in the later years), and the chair of the ACS Division of Colloid and Surface Chemistry for the meeting year, is summarized in Table A1 of the Appendix. The technical program for all the meetings (with some exceptions) are also available and hopefully will be posted on a publicly accessible website in the near future.

Three previous publications in the literature discuss the history of the colloid symposium. The origin of the first symposium at the University of Wisconsin has been described by J. Howard Mathews, who conceived and organized it, in a talk presented (*1*) at the 40th colloid symposium, also held at the University of Wisconsin. At the 40th symposium, Lloyd Reyerson traced the first four decades of history of the colloid symposium (*2*). The 50th colloid symposium held in Puerto Rico was organized by Milton Kerker from Clarkson University, who has written (*3*) about the significance of using the name "International Conference on Colloids and Surfaces", thus acknowledging the broad scope of the symposium covering colloid and surface science and also initiating a series of triennial international colloid symposia that have followed.

First Colloid Symposium

Howard Mathews has described the origin of the first colloid symposium held in 1923 and the following is a brief summary from his paper (*1*). Instruction in colloid chemistry as a distinct subject area, began in 1909 at the University of Wisconsin, with a lecture course taught on alternate years. Mathews taught the course until 1923 even after assuming chairmanship of the chemistry department in 1919. Around this time, graduate education in various disciplines was being built up at the university and the need was felt to stimulate research in chemistry as a way to build up the graduate program. At a discussion in 1922 between the Dean of the Graduate School, Charles S. Slichter and Mathews, Slichter suggested the organization of a symposium to provide stimulus to research. Given the interest of Mathews, it was decided that it would be a symposium in colloid chemistry. Mathews felt that having a foreign guest of honor will make the symposium draw great attention and be impactful and therefore it was decided to invite a foreign guest and build the symposium around the honoree's research. Mathews thought of the young Swedish chemist, The Svedberg from Uppsala, as the most prominent experimentalist in the field of colloid science and proposed inviting him to spend a semester at the University and to build a symposium surrounding his research. At that time, Svedberg was beginning the design and construction of a centrifuge that could operate at high revolutions to enable the study of colloidal dispersions with small particle sizes. The invitation to be in Wisconsin was accompanied by the offer of facilities to construct the equipment, and a centrifuge operating at approximately 150 times gravity was constructed during Svedberg's stay at Wisconsin. On returning to Uppsala, Svedberg continued to improve the construction, first to build a centrifuge operating at 7000 times the gravity and eventually one

operating at 100,000 times the gravity, which he named an ultracentrifuge. With this ultracentrifuge it was possible to cover the entire size range of classical colloidal dispersions down to the smallest particle sizes and even study actual molecular solutions of proteins and polymers. Svedberg's impactful studies at Wisconsin and Uppsala were eventually recognized by the 1926 Nobel Prize in Chemistry.

Svedberg was the acknowledged foreign guest of honor at the first meeting held on June 1923. In his paper, titled, "Colloid Chemistry Technique", Svedberg pointed out that colloid science needed to originate and develop new experimental equipment which was specially designed for use in this (then) new area of science. Reyerson (*2*) quotes from Svedberg's paper, "We have to contemplate the properties of colloids, as far as we know them, and ask ourselves: what kind of instruments would one like to have at one's disposal to study such systems? I think that such a method would pay much better in the long run than just to take the instruments that one might happen to come across in the field of ordinary physics and chemistry and try to study colloids by those instruments."

The organization of this first symposium had the support of the Committee on the Chemistry of Colloids of the National Research Council (NRC), especially of its Chairman, Harry N. Holmes from Oberlin College and Wilder D. Bancroft from Cornell University, an influential member (*1*) of the committee and the founding editor of the Journal of Physical Chemistry. At the first colloid symposium, each of the eleven members of the NRC Committee presented a paper, and fourteen others contributed papers. The papers discussed the preparation, properties, and behavior of a number of colloidal systems such as gels, jellies, emulsions, membranes, films as well as colloids obtained from naturally occurring materials. Notable among these was the paper entitled "The Problem of Adsorption from the Standpoint of Catalysis," by Hugh Taylor which had a great impact on the future development of the field of catalysis.

The 26 presentations in total, including that of Svedberg, were delivered over the course of three days, with all papers presented to the entire audience of nearly 175 present. The audience was a blend of industrial and academic scientists (*2*) The industrial chemists came from diverse laboratories such as rubber, oil, glass, soap, adhesives, forest products, leather, paper, and photographic materials. While most of the university scientists were physical or chemical scientists, there were a number from the biological, medical, and some related agricultural sciences. All the paper presentations, including the lecture of Svedberg, appear to have been short and most of the time was spent on extensive discussions around the presented papers.

Mathews introduced this meeting as the First Annual National Colloid Symposium, and this was the beginning of what is now a traditional three-day symposium, mostly held in June, that has endured for the last hundred years. At each succeeding symposium in the early years, with few exceptions, a distinguished foreign scientist was invited to attend as the honored guest. Each symposium was, in part at least, organized around the colloid interests of this guest of honor. The responsibility for arranging future symposia was given to the Colloid Committee of the National Research Council. Members of this committee present at the first symposium voted to accept the invitation from Northwestern University to host the 2nd colloid symposium.

Early Years of Colloid Symposia

At the 2nd symposium held at Northwestern University, 19 papers were presented, 12 from academia and 7 from industry. Leonor Michaelis from the University of Nagoya, the foreign guest of honor, opened the meeting with a paper entitled "General Principles of Ion Effects on Colloids." A meeting summary that appeared in I&EC stated that nearly 300 attended, with 152 coming from

outside Chicago, of whom 68 were university or college men, 67 were men connected with industrial concerns, 6 came from Government laboratories, 3 were consulting chemists, 2 were journalists, and 6 gave no classification. The use of the term 'men' in the meeting report seems to suggest that there were no women scientists participating. The academic and industrial participants were evenly balanced in the audience. A striking feature of the symposium, according to this meeting report, was the keen interest and appreciation displayed by the industrial group in the papers involving fundamental research. The report notes that the paper by Elmer O. Kraemer from the University of Wisconsin on "Brownian Movement in Gels" attracted great attention, with motion pictures used for the demonstration of the experiments. They were shown three times on three successive days, because of the great demand to study them.

Harry B. Weiser from the Rice Institute succeeded Harry N. Holmes as chairman of the Colloid Committee of NRC in 1926. For almost 20 years thereafter, Harry Weiser took charge of the successive symposia that were held. Reyerson's paper discusses the first five symposia in great detail (*2*). Herbert Freundlich from Kaiser Wilhelm Institute, Berlin was the foreign guest of honor at the 3rd symposium and opened the session with his paper on "The Electrokinetic Potential". The 4th symposium was held at MIT. James McBain from Bristol University, well known for research on self-assembly properties of soap molecules was the honored foreign guest and he opened the meeting with his paper, "A Survey of the Main Principles of Colloid Science". This is the first time a woman scientist is identified as presenting a paper, "Pectin Jellies", presented by Genevieve Spencer from Cornell University. These first four colloid symposia were held under the sponsorship of the Colloid Committee of the National Research Council.

The 4th symposium at MIT took place around the same time that the American Chemical Society was weighing in on establishing a Division of ACS to represent the growing interest in colloid chemistry. ACS President James F. Norris and ACS Secretary Charles Parsons were among the participants attending the 4th colloid symposium. At the Golden Jubilee Meeting of the ACS in Philadelphia in September 1926, the ACS council voted to establish a Division of Colloid Chemistry within the ACS. Beginning with the 5th symposium, the Division of Colloid Chemistry of the American Chemical Society has planned and directed the meetings. A Colloid Symposium Committee was appointed to oversee these national meetings. The chairs of the Colloid Symposium Committee, listed in Table A2 of the Appendix, have played a critical role in ensuring the continuity in the organization of the colloid symposia for hundred years.

The 5th symposium was held at the University of Michigan in June 1927. The foreign guest, H. R. Kruyt from Utrecht opened the symposium with the lecture "Unity in the Theory of Colloids". At this meeting, there was a topical symposium on plasticity with E. C. Bingham from Lafayette College in the lead. This was the first time a thematic session was included as part of the colloid symposium. At the 6th colloid symposium held at the University of Toronto, 25 papers were presented. The meeting report indicates that the individual presentations were from 10 to 25 minutes long. William B. Hardy from Cambridge was the foreign guest of honor and lectured on "Application of Colloids to Biological Problems". The symposium included the presentation "Adsorption of sodium oleate at the air-water interface" by Mary Evelyn Laing from Bristol (who became the spouse of James McBain in 1929), only the second woman scientist so far, who had presented in the six colloid symposia held by then. At the 7th symposium held at The Johns Hopkins University, F.G. Donnan from University College, London was the honored foreign guest, and he presented the lecture "The scattering of light in sols and gels".

For the first fifty years of the colloid symposia, the traditions established in these early symposia were generally followed. All symposia were three-day long, held in June, most symposia had a foreign guest of honor, and their lectures reflected the active areas of interest to the colloid community at those times. Typically the meetings had 20 to 30 presentations, most of them short, and the three days of the meeting were mostly devoted to extended discussions among the participants. This was made possible by the fact that there were only a small number of presentations, and the number of participants typically was 5 to 10 times larger than the number of presenters. The audience included a balanced representation of academic and industrial researchers demonstrating the interest of industry in following fundamental research being done at academic institutions.

The 8th Colloid Symposium held at Cornell University had William L. Bragg from the Victoria University of Manchester, the youngest 1925 Nobel laureate in Physics, as the foreign guest of honor. At the 9th Colloid Symposium held at Ohio State, there was no designated foreign guest of honor. This is the first meeting that featured an exhibition of colloid equipment. The colloid exhibits included colloid mills, the Vulcalock process, a super-centrifuge, demonstrations of purification by activated charcoal, flotation, properties of enamels, numerous ceramic problems and developments, ore beneficiation, pulverized fuel, etc. The 10th symposium was held in Ottawa in 1932 and was co-sponsored by the National Research Council of Canada. Emil Hatschek from Sir John Cass Technical Institute, London was the foreign honoree and presented the lecture "The Study of Gels by Physical Methods". The 1933 colloid symposium did not take place because of the state of the economy following the Great Depression. Initially Svedberg had been expected to participate in the 1933 symposium, marking ten years from the inaugural one, but this was not realized. At the 11th symposium held at the University of Wisconsin in 1934, there was no foreign guest of honor. At the 12th symposium held at Cornell University, Arne Tiselius from Uppsala (a future Nobel laureate in Chemistry, in 1948) was the honored guest who presented the lecture "Adsorption and Diffusion in Zeolite Crystals". At the 13th symposium held at Washington University, Peter Koets from Utrecht was the foreign honoree, and lectured on "Coacervation of Amylophosphoric Acid and Proteins". At the 14th symposium at the University of Minnesota, Herbert Freundlich from Kaiser Wilhelm Institute, Berlin was honored and presented a lecture "Some Recent Work on Gels". The 15th symposium at MIT welcomed Wolfgang Ostwald from the University of Leipzig as the guest of honor and he lectured on "Colloid Coagulation and Electrolyte Activity". At the 16th symposium at Stanford, J. D. Bernal from the University of London was the honoree and presented the lecture "X-Ray Analysis and the Structure of Colloidal Solutions". At the 17th colloid symposium held at the University of Michigan, James McBain, who had by then moved from Bristol to Stanford, was the honoree. This started the tradition of the guest of honor being not necessarily a foreign scientist but selected from within the US as well. The 18th Colloid Symposium, held at Cornell University, was designated as the Wilder D. Bancroft Colloid Symposium in recognition of the contributions of Professor Bancroft in the field of colloid science. Professor Bancroft opened this meeting with a review of the important developments in colloid chemistry of the past 30 years in a 30-minute lecture. Interestingly, he predicted that medicine would come to be recognized as a branch of colloid chemistry. While this may not exactly be the case, indeed nanomedicine has now become in important and influential part of colloid science research and applications.

At the 20th symposium held at the University of Wisconsin, Svedberg returned as the foreign guest of honor. In his paper "The Physical Chemistry of High Molecular Carbohydrates", he discussed advances in the knowledge of the polysaccharides, especially cellulose and its derivatives, through the application of physical methods, particularly the ultracentrifuge and osmometric

balance. This meeting marked the final one organized by Harry B. Weiser, who retired after twenty years of service as chairman of the colloid symposium committee. The 21st National Colloid Symposium at Stanford University was designated as the "McBain Colloid Symposium," in tribute to his retiring as professor of chemistry at Stanford and his lifetime of contributions to colloid chemistry.

The 22nd colloid symposium was held at MIT in June 1948 with Peter Debye from Cornell (1936 Nobel laureate in Chemistry) as the honoree who opened the meeting with the paper "Light Scattering in Soap Solutions". Experts in colloid chemistry who were at this colloid symposium visited the Army Chemical Center in Maryland for the following three days, to take part in a symposium on the military aspects of colloids and to get better acquainted with the work of the Army Chemical Corps Technical Command. William Harkins, James McBain, Peter Debye, Irving Langmuir (1932 Nobel laureate in Chemistry), Paul Emmett, Paul Flory (a future Nobel laureate in Chemistry, in 1974), Irving Klotz, Raymond Fuoss, Earnest Hauser and Robert Kunin were all participants lecturing at this Army symposium focused on colloid science. This is just an example of how academic scientists were closely connected with technology development and applications in the industry and government laboratories.

The 25th colloid symposium held at Cornell University was the first time it was organized as a joint symposium of the Division of Inorganic and Physical Chemistry and the Division of Colloid Chemistry and on a specific theme of "Complex Ions and Polyelectrolytes". Each division organized three half-day sessions, over three days, and the fourth day was devoted to the presentation of general papers contributed to the Colloid Division. Similarly, the 30th National Colloid Symposium held at the University of Wisconsin was organized as a joint meeting with the Division of High Polymer Physics of the American Physical Society, the ACS Division of Physical and Inorganic Chemistry, and the APS Division of Chemical Physics and included a symposium on Valency and Chemical Bonding. The foreign guest of honor, R. M. Barrer from Aberdeen addressed the meeting on "Aspects of Intracrystalline Sorption".

Beginning of Thematic Sub-symposia

At each of the first 30 colloid symposia, the technical presentations covered various topics of interest, and special emphasis was given to the topic presented by the foreign honoree. The technical sessions always included a mixture of topics. Subsequent colloid symposia started being organized incorporating multiple thematic sub-symposia. I list the below examples mainly to highlight how different topics of colloid science became the focus of interest over time. At the 29th colloid symposium held at Rice University in 1955, sub-symposia were held on catalysis, electrode processes, and sedimentation. The 30th colloid symposium at the University of Wisconsin featured sessions on adsorption, the effect of high energy radiation on colloids and polymers, intrinsic colloids, ion exchange membranes, surfaces and interfaces, and association colloids. At the 31st colloid symposium, the program included focused groups of papers on foams, surface films, organic and inorganic colloids, adsorption, and ion binding in polymers. The 32nd colloid symposium at the University of Illinois included papers on solid state chemistry of colloids, adsorption of gases, surfaces and interfaces, and foams.

The practice of having thematic symposia organized by specific organizers, similar to the current practice, started at the 35th colloid symposium held at the University of Rochester in 1961. A symposium "Nucleation and Growth in Nonmetallic Systems", under the chairmanship of Fraser

Price, and another, ''Coacervation and Complex Formation'', under the co-chairmanship of John Cann and Arthur Veis were organized. Just preceding this symposium in early 1961, the Division renamed itself to its current name, ''Division of Colloid and Surface Chemistry'' to recognize the broad scope of its activities. The 36th colloid symposium at Stanford included sessions on ''Ultracentrifugation'' and on ''Monolayer Structure and Behavior''. At the 37th, symposium held at Carleton University, Ottawa, the topics were ''Solid-gas interface'' and ''Solubilization phenomena''. At the 38th colloid symposium held at the University of Texas, the thematic sessions were ''Models and Mechanisms at Interfaces'', and ''Surface Diffusion''.

The 39th colloid symposium was the first time it was organized at Clarkson University, which was emerging as a leader in colloid education and research. At this meeting, sub-symposia were held on coagulation, aerosols, and membrane biophysics, with the foreign honoree Aaron Katchalsky from Weizmann Institute lecturing on ''Membrane Biophysics''. This is the first time when Russian colloid scientists appear to have participated in the colloid symposium, with N. A. Fuchs and Boris Derjaguin presenting at this meeting.

The 40th colloid symposium held at the University of Wisconsin in June 1966, included the thematic topics of the ''Physical chemistry of DNA'' and the ''Rheology of colloidal and disperse systems''. Manfred Eigen (1967 Nobel laureate in Chemistry) was the foreign honoree whose plenary lecture was on the kinetics of melting double-stranded helixes formed from oligonucleotides. This was the last time, the colloid symposium was held at the University of Wisconsin which had hosted the 1st, 11th, 20th, 30th and 40th symposia. Howard Mathews who originated the first colloid symposium, had the distinction of opening all five of these symposia held at Wisconsin. At the 41st colloid symposium organized at SUNY Buffalo, the topic included monolayers, molecular sieves, and the gas-solid interface. The 42nd colloid symposium at the Illinois Institute of Technology had sessions with themes ''Advances in Light Scattering Methods of Observation and Analysis'' and ''The Interface in Composites''.

At the 43rd colloid symposium organized by Tom Fort Jr. at Case Western Reserve University, technical symposia included those on carbon surfaces, polymer surfaces, and adsorption from solution. This was the first meeting where two sessions were held in parallel on one of the meeting days.

The 44th colloid symposium at Lehigh University in June 1970 included symposia on techniques for studying metal surfaces, anomalous water, and water at surfaces. The most exciting symposium drawing international attention was the one on anomalous water. The foreign honoree Boris Derjaguin from the USSR Academy of Sciences presented his research on water, proclaiming the existence of anomalous water (polywater) as a new distinct substance. The topic drew great interest for obvious reasons, but it did not take long for the idea of anomalous water to be discarded by later research.

The 45th colloid symposium at Georgia Tech had thematic sessions on surface tension, aerosols, auger spectroscopy of surfaces, and gas-solid interactions. This was the meeting where the first LaMer award was presented. The LaMer award had been instituted in honor of Victor K. LaMer of Columbia University, who was the founding editor of the Journal of Colloid Science (now, Journal of Colloid and Interface Science, JCIS). LaMer award is given to recognize an outstanding Ph.D. thesis accepted by a US or Canadian university during the three-year period prior to the award year. The first awardee to be recognized was Charles W. Querfeld from Clarkson University for his Ph.D. dissertation ''Multiple Scattering in a Synthetic Foggy Atmosphere''. The LaMer award has become one of the most prestigious awards given by the Division of Colloid and Surface Chemistry and the

LaMer award lecture has become a tradition of the National Colloid Symposium following the 45th symposium. The list of LaMer awardees is presented in Table A3 of the Appendix.

50th Symposium—Birth of International Conference on Surface and Colloid Science

The 50th colloid symposium in 1976 coincided with the centenary of the founding of the American Chemical Society and the 50th anniversary of the founding of the ACS Division of Colloid Chemistry. The meeting was organized by Milton Kerker from Clarkson University, and he has written (3) about how this meeting came into being and the significance of this meeting to future developments. Until this time the colloid symposia were three-day events, limited in size and scope. In each of the first 25 colloid symposia, as Figure 1 shows, approximately 25 papers were presented in the three-day meeting with most of the meeting time devoted to extensive discussions. In the subsequent 24 colloid symposia, between 25 and 60 papers were presented and only rarely were two sessions held simultaneously for a part of the meeting time. Kerker planned and executed an ambitious 50th colloid symposium to mark the historical significance associated with the event. The symposium was held in Puerto Rico and it was a five-day event, expanding the meeting from the traditional three-day meeting. The symposium was named the "International Conference on Colloids and Surfaces" and was sponsored by the ACS Division of Colloid & Surface Chemistry and the International Union of Pure & Applied Chemistry. This 50th anniversary meeting was the first one to rename the National Colloid Symposium of the first 49 years to the new name "Colloid and Surface Science Symposium", which has since continued being used, to reflect the breadth of the field, scientific interests and participation.

The symposium also had "International" in the title. At the 50th symposium, Kerker gathered colleagues from a number of countries to propose that this meeting be followed by similar international meetings on a triennial basis, to meet in different host countries. That is how the 50th symposium became the precursor to the series of triennial symposia that are sponsored by the International Association of Colloid and Interface Scientists (IACIS) and hosted by the colloid societies of various countries, including the ACS Division of Colloid and Surface Chemistry.

The five-day symposium at Puerto Rico featured 280 presentations distributed over ten different thematic symposia: Rheology of disperse systems, Atomic and molecular processes at solid surfaces, Aerosol science and atmospheric physics, Membranes, Stability and instability in disperse systems, Liquid crystals, Catalysis, Surface thermodynamics, Water at interfaces, and Forces at interfaces. 10 plenary lectures and 34 invited lectures were included. This was the first major expansion of the colloid symposium, going well beyond all previous symposia which featured only 20 to 60 presentations. Of necessity, a system of multiple parallel sessions got established, which continues up to the present day. Because of the broad scope of this meeting, the organization of the meeting moved from the hands of the Symposium Committee of the Division to a Symposium Chair/Organizer at the host institution working with a group of organizers designated for organizing the technical content of each sub-symposium at the meeting. In most of the previous meetings, the technical content was influenced by the Colloid Symposium Committee and the local organizers were mainly responsible for the logistics of the conference. Starting with the 50th symposium, the role of local organizers in influencing the content of the meeting became a common characteristic of the colloid symposia.

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Colloid and Surface Science Symposia in My Time

The 51st Colloid and Surface Science Symposium was held at Buffalo in June 1977 with Theo Overbeek from Utrecht and Adrian Parsegian from the National Institutes of Health (NIH) as plenary speakers. I was a graduate student at that time in the Department of Chemical Engineering and Robert J. Good from the department was the organizer of the meeting. This was the first colloid and surface science symposium I had the privilege to attend and see in person as well as listen to the lectures of many legends in the field including Theo Overbeek, Adrian Parsegian, Egon Matijevic from Clarkson University, and Wilhelm Neumann from the University of Toronto. At the 52nd colloid symposium held at the University of Tennessee, Knoxville, Lisbeth Ter-Minassian-Saraga from the Laboratoire de Physico-Chimie des Surfaces et des Membranes, Paris was the honoree. Based on the information I have reviewed, this was the first time a woman scientist was invited as a foreign honoree to present a plenary lecture.

The 55th symposium held at Case-Western Reserve University in June 1981was the first colloid and surface science symposium where I had the privilege of presenting a paper "Estimation of Lubricant Film Thickness Using Porous Media Viscometry Technique". This study attributed the anomalous near-surface viscosity of liquids containing colloidal particles to the formation of rigid surface films. I continued my active participation in the colloid symposium by presenting a paper "Are Large Micelles Rigid or Flexible? A Reinterpretation of Viscosity Data for Micellar Solutions" at the 56th symposium held at Virginia Tech. James (Jim) Wightman was the organizer of this meeting, and he was soon to become the Chair of the Colloid and Surface Science Symposium Committee. He suggested my getting involved with the symposium organizing activities. The 58th symposium was held at Carnegie-Mellon University in June 1984 with Gerhard Ertl (a future Nobel laureate in Chemistry in 2005), Robert Ottewill and Alex Silberberg, as plenary speakers. At this meeting, I gained my first experience organizing a technical symposium, one on "Micellization and Solubilization". Pasupati Mukerjee, Nicholas Turro, Desmond Goddard, Heinz Hoffmann, Paul Holland, Lawrence Pratt, Ken Dill, Josip Kratohvil, and Edward Dennis were invited speakers at the symposium. Papers presented at this thematic symposium were published in a special issue of Advances in Colloid and Interface Science. The 59th symposium held at Clarkson in 1985 was aligned with the 5th International Conference on Surface and Colloid Science, cosponsored by IACIS. This was a five-day symposium with Ivan Giaever (1973 Nobel laureate in Physics) and Pierre G. deGennes (a future Nobel laureate in Physics in 1991) presenting the plenary lectures and featuring nearly 700 presentations.

By this time, Jim Wightman had become the Chair of the Symposium Committee for the Division and had me committed to organizing the Colloid and Surface Science Symposium at Penn State in 1988. I attended the 61st symposium at the University of Michigan to follow the tradition of inviting the participants to attend the 62nd symposium to take place the following year at Penn State. My co-organizers were experienced colleagues, Bill Steele from the Chemistry Department, well-known for his research on gas-solid interactions and editorship of Journal of Physical Chemistry and Langmuir and Richard Hogg from the Mineral Engineering Department, well-known for his work on dispersion stability, coagulation and flocculation. At the Penn State meeting, 266 papers were presented in eight parallel sessions. I had invited Dominique Langevin from École Normale Supérieure as a plenary speaker, who had established international prominence for her work on surface light scattering and microemulsions. It was only the second time a woman scientist had been invited as a plenary speaker over the course of the 62 colloid symposia. While researching for this chapter, I noted that this was the first colloid and surface science symposium where a poster

session was organized as part of this meeting. Poster sessions have become a standard feature of all subsequent colloid symposia. Some of the poster presenters were students and it appears this might have been the first colloid symposium where students were included as presenters. Students are now a major presence at all colloid symposia as presenters and participants. The Penn State meeting also featured the ACS Kendall Award (now, the ACS Award in Colloid Science) symposium honoring Howard Brenner, who also presented a plenary lecture. Traditionally, ACS award winners present their award lectures at the ACS national meetings and the award-related symposia are also organized at the ACS national meetings. But this was a departure, since Brenner wanted to present at the more intimate colloid and surface science symposium rather than at the more massive ACS national meeting. However, this practice was not followed in any subsequent colloid symposia at the direction of the Division, which favors holding these ACS award lectures and award-related symposia at the national meeting of the ACS.

Penn State hosted the colloid symposium for the second time ten years later and I served as co-organizer of the 72nd colloid symposium, with my colleagues Bill Steele from the Chemistry Department and Kwadwo Osseo-Asare from the Materials Science and Engineering Department (well known for his studies on colloidal and interfacial aspects of materials synthesis and processing, including those of nanomaterials). At the time of this meeting, the Penn State Conference Center with a hotel and meeting rooms had been built and those facilities made the logistical organization of this symposium easy to accomplish.

A few years later, for unspecified reasons, the organization of the 76th symposium at the University of Michigan got inordinately delayed and there was concern whether we could organize the symposium in the limited time available. I volunteered to lead the organization of the symposium with Stacy Bike from the University of Michigan as co-organizer (known for her work on the measurement of colloidal forces and rheology of solids-in-liquid dispersions), thus getting the opportunity to organize the symposium for a third time and at an institution different from the one I belonged to. The Conference Center at Michigan did an astounding job, and I was able to organize the symposium without visiting the Ann Arbor campus of the university even once. Alice Gast and Adi Eisenberg accepted the invitations to present plenary lectures at short notice and the meeting was successfully held. Alice Gast was only the third woman scientist to be featured as a plenary speaker in the 76 years of the colloid symposia.

The 78th symposium held at Yale in June 2004 was organized by John Walz and Menachem Elimelech and marked the inauguration of the first Unilever award lecture, with the first awardee, Christine Keating from Penn State presenting the award lecture. This award, sponsored by the Unilever Corporation, is to recognize fundamental work in colloid or surfactant science carried out in North America by researchers in the early stages of their careers. The award criteria include originality, quality, and significance of the work and its potential impact on current and future research as well as on industrial and commercial applications. The list of Unilever award recipients is included in Table A4 of the Appendix. The Unilever Award lecture is now a standard feature of the colloid symposia.

The 83rd symposium organized at Columbia University was aligned with the 13th International Conference on Surface and Colloid Science, cosponsored by IACIS. This five-day meeting featured Gabor A. Somorjai from Berkeley, Yoshio Okahata from Yamagata University, Ivar Giaever from RPI and University of Oslo, Matt Trau from the University of Queensland and Brian J. Vincent from Bristol as plenary speakers and included an extraordinarily large number of 1300 presentations.

After retiring from Penn State in 2005 and moving to the US Army Soldier Center in Massachusetts, I got the opportunity to organize a colloid symposium for the fourth time, at Harvard

University. David Weitz from Harvard and Joyce Wong from Boston University were my co-organizers. For this 90th symposium held in June 2016, David Weitz helped secure the meeting rooms and other conference facilities at Harvard at little or no cost, allowing us to organize the meeting at a reasonable cost (see later discussion about costs). Joyce Wong helped secure dormitory accommodations for participants at Boston University, thus softening the cost of lodging, a burden the Boston hotels would have imposed on the participants. We invited two outstanding women scientists to be plenary lecturers, Françoise Brochard-Wyart from the Curie Institute in Paris and Eugenia Kumacheva from the University of Toronto. The technical program included 592 presentations distributed over 13 thematic symposia.

COVID-19 and Virtual Colloid Symposia

When the time for the 94th symposium to be hosted by Rice University in June 2020 came up, the world was faced with the challenge of COVID-19. Most academic laboratories globally were shut down in March 2020 and a future, free of COVID-19, did not appear on the near horizon. Normally, March would be the month when the abstracts for participating in the Colloid symposium would be submitted and the details of the technical meeting as well as all logistical support would be finalized. All this became impossible, creating a challenge for the organizers at Rice University in deciding on a course of action to follow. Similar impactful events such as the Great depression and the Second World War had caused the colloid symposia not to be organized for four years in the past. However, the colloid symposium organizers at Rice University, Sibani Lisa Biswal, Christy Landes and Matteo Pasquali, decided to go ahead with the meeting, but organize it as a virtual symposium. The meeting was planned and executed at short notice with 58 presentations, and they were thus able to maintain the continuity of the symposium, despite the smaller number of presentations that could be accommodated in a hastily arranged virtual meeting.

The experience of the 94th symposium organized by Rice University as a virtual event turned out to be important for the 95th colloid symposium in 2021. Since the pandemic was still in full force, right from the outset plans were made to organize a virtual meeting. The experience of the 2020 symposium meeting helped in planning the 95th symposium. With Mathew Helgeson (University of California at Santa Barbara) and Sibani Lisa Biswal (Rice University) as co-organizers, I organized the 95th symposium with all the features of the normal colloid symposium but held entirely virtually. This was the fifth colloid symposium I had the privilege to organize. The 95th symposium included 16 thematic technical symposia, a fundamental research/general papers symposium, and a poster symposium. It featured two plenary lectures, by Maria Santore (U Mass Amherst) and Catherine Murphy (University of Illinois), the Unilever award lectures by Sujit Datta (2020 recipient) and Lilian Xiao (2021 recipient), and LaMer award lectures given by Xiao Su (2020 recipient) and Rose Cersonsky (2021 recipient). As in previous colloid symposia, there was also an exhibition highlighting advances in instrumental techniques in colloid and surface science, that took place virtually with live interactions. The meeting also included the graduate student oral presentation award competition sponsored by the ACS journal Langmuir and the ACS Division of Colloid and Surface Chemistry. Student posters were also judged for best poster awards sponsored by Langmuir. The meeting registration fee was set at $75 for non-students and $25 for students and anyone not able to pay for any reason was not required to pay. The virtual meeting had 549 attendees with 455 paying registration fees. With this meeting, the colloid symposium achieved another milestone, the ability to be organized as a successful virtual symposium.

Focus on Students: Langmuir Graduate Student Award

To the best of my knowledge, students did not present papers at the colloid symposia for the first 60 symposia. Typically the presentations were given by faculty members and industrial researchers. The 62nd symposium at Penn State which I co-organized included a poster session for the first time, with presentations by students. However, recent meetings are characterized by significant participation of students, who account for almost a third of the meeting participants and meeting presentations at both oral and poster sessions. Acknowledging the importance of students and seeking to recognize their contributions, Michael Bevan and Joelle Frechette initiated the Langmuir Graduate Student Awards at the 86th symposium they organized at the Johns Hopkins University in 2012. Since then the awards for best graduate student oral presentations have been sponsored by the ACS journal Langmuir and the ACS Division of Colloid and Surface Chemistry. These awards aim to recognize excellence in research as manifested in oral presentations. Graduate students are asked to apply for this competition by submitting a long abstract of 2 pages, a 2-page CV, and a recommendation letter from the student's PhD advisor. A selection committee reviews these applications and selects about ten students to participate in a special "Langmuir Graduate Student Oral Presentation Award" session. A panel of judges including the Editor of Langmuir, attend this session and select the top three awardees based on the timeliness and relevance of the research to the field of colloid and surface science, clarity in the statement of the problem and research goals, soundness of the approach, and actual accomplishments in research. This student competition has developed into a successful program with 40 to 50 students nominated by their advisors, to participate in this competition every year. Françoise Winnik from the University of Helsinki, who retired from her position as Editor-in-Chief of Langmuir at the end of 2019, and Gilbert Walker from the University of Toronto, who assumed this position in early 2020 have been active supporters of this student-focused activity over the last ten years and have served as judges for selecting the student winners at the oral presentation sessions.

Honoring Colloid and Surface Scientists

The practice of honoring leaders of colloid and surface science at the National Colloid Symposium that started with honoring Wilder Bancroft at the 18th symposium at Cornell University and James McBain at the 21st symposium held at Stanford has continued, with the inclusion of special technical symposia at the meetings. At the 53rd colloid symposium at the University of Missouri, symposia on "Aerosols" honoring Albert Zettlemoyer, on "Gas-Solid Interactions" honoring Lloyd B. Thomas, and on "Colloidal Dispersions" honoring Wilfried Heller were organized. The 54th meeting held at Lehigh University included symposia honoring Albert Zettlemoyer and Frederick Fowkes. The 55th symposium held at Case-Western Reserve University was dedicated to the memory of Frank Goodrich. The 56th colloid symposium at Virginia Tech included an "Electrochemistry and Corrosion" symposium honoring Norman Hackerman. At the 60th colloid symposium held at Georgia Tech, a memorial symposium was organized to recognize Kiselev's contributions to adsorption science. The 64th colloid symposium at Lehigh included a symposium on "Substrate/Polymer Interface" honoring Henry Leidhelser Jr., a symposium on "Acid-Base Interactions" in honor of the 75th birthday of Frederick Fowkes, and a symposium on the "Rheology of Concentrated Dispersions and Associative Thickeners" honoring Irvin M. Krieger. At the 68th symposium held at Stanford University, organized by Alice Gast, there was a special catalysis

symposium honoring Michel Boudart on his 70th birthday. At the 69th symposium held at the University of Utah, Sydney Ross was honored with a symposium to mark his 80th birthday. At the 72nd symposium which I co-organized at Penn State, a special symposium, "Emulsions, Foams, and Thin Films" was organized to honor Darsh Wasan on his 60th birthday. The 74th colloid symposium at Lehigh included the "Polymer Colloids" symposium in memory of John W. Vanderhoff.

The colloid symposium has honored outstanding scientists by inviting them as foreign honorees or plenary speakers at each of the 97 national meetings. The listing of those honored in this way is included in Table A1 of the Appendix. The list includes many who had been recognized by the Nobel award either at the time of their participation in the colloid symposia or at a later year. The Nobelists include The Svedberg, William Bragg, Arne Tiselius, Peter Debye, Carl F. Cori, Manfred Eigen, Ilya Prigogine, Gerhard Ertl, Ivan Giaever, Pierre deGennes, and Fraser Stoddart. Other plenary speakers are no less distinguished, they are legends in the field, and whose work we study in textbooks today - Freundlich, Kruyt, Hardy, Donnan, Ostwald, Bernal, McBain, Bancroft, Michaelis, Barrer, Overbeek, Herman Mark, DeBoer, Katchalsky, Everett, Alexander, Derjaguin, Halsey, Ottewill, Brian Vincent, Kerker, Matijevic, John Thomas, Israelachvili, Tabor, Ninham, Whitesides, Ringsdorf, just to name a few. I have intentionally left out naming the outstanding plenary lecturers from recent years who are still very active practitioners in our field.

Recognition of Women Scientists

Women colloid and surface scientists have been participating in the colloid symposia as presenters from the 4th colloid symposium onwards, though the early meetings featured just 1 or 2 participants. Over the course of the first 40 colloid symposia, nearly 1200 presentations were made, of which I could identify only 24 papers presented by 16 women scientists. These early participants in the colloid symposia included: Genevieve Spencer from Cornell University (4th), Mary Evelyn Laing McBain from Bristol (6th, 19th), May Annetts from University of Toronto (12th), Dorothy Jordan Lloyd who was Director of British Leather Manufacturers Research Association, London (14th), Katharine Blodgett from General Electric (14th), Wanda Farr who was Director, Cellulose Laboratory, Boyce Thompson Institute for Plant Research, Yonkers, New York (14th, 15th, 22nd), Helen Quincy Woodard from Huntington Fund for Cancer Research, Memorial Hospital, New York City (14th), Désirée LeBeau, who was Director of Research, Midwest Rubber Reclaiming Co and Colloid Division Chair in 1949 (15th, 16th, 21st), Eloise Jameson from Stanford University (15th, 16th), Marjorie Vold from University of Southern California known to us through her classic text book "Colloid Chemistry" written with Robert Vold (24th, 26th , 33rd), Ruth Benerito from USDA who was inventor of wrinkle resistant cotton and recognized by the Lemelson-MIT Lifetime Achievement Award for her work on textiles (28th), Carroll L. Lloyd from Johns Hopkins (28th), Harriet G. Heilweil from Ohio State (29th), Sallie Fisher from Rohm and Haas Co., Philadelphia (31st), Lisbeth Ter-Minassian-Saraga from University of Paris (36th), and Mary Jane Tunis from UC Berkely (40th).

The first time a woman scientist was recognized as a plenary speaker was at the 52nd colloid symposium held at the University of Tennessee, Knoxville. Lisbeth Ter-Minassian-Saraga from the CNRS unit Physico-Chimie des Surfaces et des Membranes, Paris was the honoree. After another ten years, at the 62nd colloid symposium in 1988 at Penn State which I co-organized, Dominique Langevin from École Normale Supérieure, Paris was a plenary speaker. Fourteen years passed, before

another woman scientist, Alice Gast from MIT was invited as a plenary speaker at the 76th colloid symposium which I co-organized at Michigan in 2002. Only three women scientists had been honored as plenary speakers over the first 76 colloid symposia. During the period between the 2002 and 2016, four other women scientists had been invited to give plenary lectures, Marie-Paule Pileni from Université Pierre et Marie Curie in 2005, Joanna Aizenberg from Harvard and Barbara J. Finlayson-Pitts from the University of California Irvine in 2013, and Tejal Desai from University of California, San Francisco in 2015. At the 90th symposium that I co-organized at Harvard in 2016, both plenary lectures were presented by distinguished women scientists, Françoise Brochard-Wyart from Institute Curie and Eugenia Kumacheva from the University of Toronto. Following the Harvard meeting in 2016, every following meeting has honored a woman scientist as a plenary lecturer. The 2017 meeting featured Kathleen Stebe from the University of Pennsylvania, Sharon Glotzer from Michigan was at the 2018 meeting at Penn State, Jennifer Lewis from Harvard was the plenary lecturer in 2019, Maria Santore from the University of Massachusetts, Amherst and Catherine Murphy from University of Illinois were plenary lecturers at the 2021 virtual symposium that I co-organized, Naomi Halas from Rice University was the plenary speaker at the 2022 symposium and Cari Dutcher from University of Minnesota and Sibani Lisa Biswal from Rice University were plenary speakers at the 2023 colloid symposium.

Many women scientists have organized colloid symposia in the recent years. Alice Gast was the first who organized and chaired the 68th colloid symposium in 1994 at Stanford. In the following years, Karin Caldwell at the University of Utah (69th), Maria Santore at Lehigh (74th), Stacy Bike at the University of Michigan (76th), Natalie Tufenkji at McGill University (85th), Joelle Frechette at Johns Hopkins University (86th), Sharon Walker at University of California Riverside (87th), Kathleen Stebe at the University of Pennsylvania (88th), Joyce Wong at Harvard (90th), Ilona Kretzschmar at City University of New York (91st), Valeria Milam at Georgia Tech (93rd), Sibani L. Biswal and Christy Landes at Rice University virtual (94th), Sibani L. Biswal at the virtual symposium (95th), Carolyn A. Koh at Colorado School of Mines (96th), and Lilian Hsiao at North Carolina State University (97th) have been organizers of these national meetings. Clearly much progress has been made in the last 30 years compared to the first 70 years, but much remains to be done to promote and recognize women scientists in our community.

Cost to Attend Colloid Symposium

For the first ten or more early colloid symposia, a customary registration fee of S3.00 was charged and students had to pay $1.50 ($1 in 1923 is roughly equal to $8 currently). Even as late as at the 34th symposium held at Lehigh University, the registration fees were still small, $4.00 for members of the Colloid Division. $7.00 for other ACS members, $9.00 for non-members, and $1.00 for students. The registration fee began to increase slowly at first, sharply later. At the 45th symposium at Georgia Tech, the registration fee was $25 while at the 50th anniversary Colloid and Surface Science Symposium at Puerto Rico, the registration fee was $40.00. At the 51st symposium the registration fee was $35 for members and the students were charged a fee of $5, a substantial reduction. The 54th symposium at Lehigh offered free student registration for the meeting. However, as host universities began charging the colloid symposium for the use of facilities, the registration fees had to be increased. At the 60th symposium held at Georgia Tech, the registration fee was $125 but the student registration remained modest at $25. In later meetings, the student registration fees also began to increase as more students were beginning to attend the meetings. At the 68th

symposium held at Stanford, the ACS member registration fee was $170, for nonmembers $190 and for students $75. At the 71st symposium at the University of Delaware, the ACS member fee had risen to $275, the nonmember fee was $325, and the student registration was $150. More recently, at the 96th symposium held at Colorado School of Mines in 2022, the student/postdoc registration fee was $250, ACS member, $525, non-ACS member, $625. At the 97th symposium held in June 2023 at North Carolina State University, the ACS member registration fee was $680, non-ACS member, $780, student/postdoc, $320, with the registration fees also covering program materials, refreshment breaks, buffet lunches, and shuttle bus service. One would have to account for the cost of lodging as well, to attend these three-day symposia. At recent meetings, university dormitory accommodations have been available costing $50 to $100 per day depending on the host institution/city. However, a significant fraction of the participants typically need to find accommodations at local hotels. At the 90th symposium which I co-organized in Boston, the hotel costs were between $300 and $400 per night. Considering the exorbitant cost to attend the colloid symposia, it is remarkable that they continue to attract large participation, reflecting the importance of the meeting to the community. For example, at the very expensive 90th symposium held at Harvard, the technical program included nearly 570 papers and over 600 researchers registered for this meeting. The increasing cost of running the colloid symposium, with typical budgets in the range of $300,000 or more, has significantly increased the responsibilities of the local organizers who are chairing the national meeting, not only to plan and organize the technical content of the meeting and all technical sessions but also to be responsible for the expensive logistical aspects of the meeting.

Colloid Symposia at Present

The colloid symposium and its organization are now well established, with the meeting having a standard structure. At each meeting, a number of thematic symposia are organized. The topics covered in the 95th symposium held virtually include: Self and Directed Assembly in Colloidal Systems, Emulsions, Bubbles, Foams, Active & Responsive Colloidal Matter, Rheology & Complex Fluids, Advanced Experimental Methods in Colloid and Interface Science, Applications of Scanning Probe Methods, Wetting and Adhesion, Surface and Interfacial Forces, Colloids and Interfaces in Energy Applications, Colloids and Interfaces in Environmental Applications, Colloids and Interfaces in Biology and Medicine, Surface Science and Catalysis, Plasmonics, Interfacing Biology with Materials, Chemical Interactions Between Colloids and at Interfaces, Nanomaterials & Advanced Manufacturing, Fundamental/General Aspects of Colloids and Interfaces, Langmuir Student Award Session and the Poster Session.

For the most recent 97th symposium held at North Carolina State University, the topics covered include: Self and Directed Assembly, Colloidal and Interfacial Phenomena, Biomaterials, Biotechnology, and Pharmaceuticals, Additive Manufacturing and Colloidal Metamaterials, Active and Adaptive Matter, Wetting and Adhesion, Microfluidics, and Nanocolloidal Systems, Colloids for Sustainability and Energy, Rheology and Tribology of Complex Fluids, Machine Learning and AI for Colloids, Emulsion, Foams, and Surfactants, Langmuir Student Award Session, and Poster Session.

One can see that there are a number of recurring topics that are covered each year and other topics reflect the interests of the symposium co-chairs and change each year. Each thematic symposium is organized by multiple organizers who volunteer and by now there exists a large community of academic and industrial scientists who have contributed by organizing these topical symposia over the years. Each colloid symposium features, the LaMer and Unilever Award lectures in addition to the traditional two plenary lectures by distinguished foreign and U.S. scientists. Each

symposium also sponsors an exhibit of colloid and surface science instrumentation. As we mark in 2023 the hundred years from the 1st colloid symposium, we can look forward to the 100th colloid symposium that will take place in 2026 which will also be the centenary year of the founding of the ACS Division of Colloid and Surface Chemistry.

Conclusions

The first National Colloid Symposium took place in June 1923 at the University of Wisconsin, with Svedberg as a foreign guest of honor. This symposium has survived for hundred years now, having missed being organized for only four years, once due to the bad economy following the Great Depression and for three years due to the Second World War. In this chapter, I have presented a brief review of the colloid symposia over the hundred years incorporating my personal experience of having been a passive and then an active participant in the last fifty years of the symposia. The symposium has remained a three-day technical event even though the small number of presentations given without any parallel presentations in the early years is now overtaken by the very large size of the symposia with ten or more parallel presentations. I have drawn attention to the evolutionary features of the colloid symposia such as the active inclusion and recognition of women scientists at these symposia, increased participation of students, now recognized through Langmuir student awards, significant role and responsibilities for the local symposium organizers, and the stimulus for the birth of the international colloid and surface science symposia. This important and living scientific and professional event, the oldest among various Divisions of the American Chemical Society, is a clear validation of the importance of this scientific field and its ability not only to survive but thrive as various scientific and technical revolutions continue to occur.

Acknowledgments

Support from US Army Combat Capabilities Development Command Soldier Center for writing this book chapter is acknowledged. Many colleagues who have held leadership positions in the ACS Division of Colloid and Surface Chemistry and as organizers of past colloid symposia, including James Schneider, Michael Bevan, Robert Tilton, Maria Santore, Wilhelm Neumann responded with information where gaps existed.

Appendix

Table A1. Hundred Years of Colloid Symposia Organization

Year	*Number*	*Location*	*Symposium Chair*	*Foreign Honoree / Plenary Lecturer*	*COLL Division Chair*
1923	1	Wisconsin	J. Howard Mathews (Wisconsin)	The Svedberg (Uppsala)	***ACS Division of Colloid Chemistry Established in 1926***
1924	2	Northwestern	Harry N. Holmes (Oberlin College)	Leonor Michaelis (Nagoya)	
1925	3	Minnesota	Harry N. Holmes (Oberlin College)	Herbert Freundlich (Kaiser Wilhelm Institute, Berlin)	
1926	4	MIT	Harry B. Weiser (The Rice Institute)	James W. McBain (Bristol)	Harry B. Weiser (The Rice Institute)
1927	5	Michigan	Harry B. Weiser (The Rice Institute)	Hugo R. Kruyt (Utrecht)	Harry B. Weiser (The Rice Institute)
1928	6	Toronto	Harry B. Weiser (The Rice Institute)	William B. Hardy (Cambridge)	Harry B. Weiser (The Rice Institute)
1929	7	Johns Hopkins	Harry B. Weiser (The Rice Institute)	Frederick G. Donnan (University College, London)	Floyd E. Bartell (Michigan)
1930	8	Cornell	Harry B. Weiser (The Rice Institute)	William L. Bragg (Manchester)	Floyd E. Bartell (Michigan)
1931	9	Ohio State	Harry B. Weiser (The Rice Institute)	-	Ross A. Gortner (Minnesota)
1932	10	National Research Council, Ottawa	Harry B. Weiser (The Rice Institute)	Emil Hatschek (Sir John Cass Technical Institute, London)	Elmer O. Kraemer (Wisconsin)
1933	Great Depression — No symposium				Elroy J. Miller (Michigan Experimental Station)
1934	11	Wisconsin	Harry B. Weiser (The Rice Institute)	-	Wesley G. France (Ohio State)
1935	12	Cornell	Harry B. Weiser (The Rice Institute)	Arne Tiselius (Uppsala)	Alfred J. Stamm (Wisconsin)
1936	13	Washington U	Harry B. Weiser (The Rice Institute)	Peter Koets (Utrecht)	Samuel S. Kistler (Illinois)
1937	14	Minnesota	Harry B. Weiser (The Rice Institute)	Herbert Freundlich (Kaiser Wilhelm Institute, Berlin)	Richard Bradfield (Ohio State)
1938	15	MIT	Harry B. Weiser (The Rice Institute)	Wolfgang Ostwald (Leipzig)	John W. Williams (Wisconsin)
1939	16	Stanford	Harry B. Weiser (The Rice Institute)	John Desmond Bernal (University of London)	Lloyd H. Reyerson (Minnesota)
1940	17	Michigan	Harry B. Weiser (The Rice Institute)	James W. McBain (Stanford)	Ernest A. Hauser (MIT)

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ACS Symposium Series; American Chemical Society: Washington, DC, 0.

Table A1. (Continued). Hundred Years of Colloid Symposia Organization

Year	*Number*	*Location*	*Symposium Chair*	*Foreign Honoree / Plenary Lecturer*	*COLL Division Chair*
1941	18	Cornell	Harry B. Weiser (The Rice Institute)	Wilder D. Bancroft (Cornell)	Arthur M. Buswell (Illinois State Water Survey)
1942	19	Colorado-Boulder	Harry B. Weiser (The Rice Institute)	-	Fredrich Olsen (Western Cartridge Company, IL)
1943	World War II — No symposium				Winfred O. Milligan (The Rice Institute)
1944	World War II — No symposium				James W. McBain (Stanford)
1945	World War II — No symposium				Geoffrey E. Cunningham (Clarkson)
1946	20	Wisconsin	Harry B. Weiser (The Rice Institute)	The Svedberg (Uppsala)	Geoffrey E. Cunningham (Clarkson)
1947	21	Stanford	John W. Williams (Wisconsin)	James W. McBain (Stanford)	C. Edmund Marshall (Missouri)
1948	22	MIT	John W. Williams (Wisconsin)	Peter Debye (Cornell)	Robert D. Vold (University of Southern California)
1949	23	Minnesota	John W. Williams (Wisconsin)	Leonor Michaelis (The Rockefeller Institute)	Desiree S. LeBeau (Midwest Rubber Reclaiming Co)
1950	24	Washington U	John W. Williams (Wisconsin)	Carl F. Cori (Washington U)	Sydney Ross (Rensselaer Polytechnic)
1951	25	Cornell	Harold A. Scheraga (Cornell)	-	Miroslav W. Tamele (Shell Development)
1952	26	USC	Winfred O. Milligan (The Rice Institute)	Richard M. Barrer (Aberdeen) Philip C. Carman (National Chemical Research Lab, South Africa)	George E. Boyd (ORNL, Tennessee)
1953	27	Iowa State	Winfred O. Milligan (The Rice Institute)	Jan T. G. Overbeek (Utrecht)	Desiree S. LeBeau (Midwest Rubber Reclaiming Co)
1954	28	Rensselaer Polytechnic	Winfred O. Milligan (The Rice Institute)	Herman F. Mark (Polytechnic Institute of Brooklyn)	Harold T. Byck (Shell Development Co)

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Table A1. (Continued). Hundred Years of Colloid Symposia Organization

Year	*Number*	*Location*	*Symposium Chair*	*Foreign Honoree / Plenary Lecturer*	*COLL Division Chair*
1955	29	The Rice Institute	Winfred O. Milligan (The Rice Institute)	Walter Feitknecht (Bern)	John D. Ferry (Wisconsin)
1956	30	Wisconsin	Winfred O. Milligan (The Rice Institute)	Richard M. Barrer (Aberdeen)	Ralph A. Beebe (Amherst College)
1957	31	Statler Hotel, New York	Winfred O. Milligan (The Rice Institute)	Jan Hendrik de Boer (Delft)	Albert C. Zettlemoyer (Lehigh)
1958	32	Illinois-Urbana	Winfred O. Milligan (The Rice Institute)	-	William A. Zisman (Naval Research Lab)
1959	33	Minnesota	B. Roger Ray (Washington State)	-	Victor K. LaMer (Columbia)
1960	34	Lehigh	B. Roger Ray (Washington State)	Jan T. G. Overbeek (Utrecht)	Stephen Brunauer (Portland Cement Association)
1961	35	Rochester	B. Roger Ray (Washington State)	Heinerle Lorenz Booij (Leiden)	Donald P. Graham (du Pont)
1962	36	Stanford	B. Roger Ray (Washington State)	Albert E. Alexander (Sydney)	Hendrick van Olphen (Shell Development Co)
1963	37	Carleton University, Ottawa	B. Roger Ray (Washington State)	William J. Dunning (Bristol)	Frederick R. Eirich (Polytechnic Institute of Brooklyn)
1964	38	Texas-Austin	Eric Hutchinson (Stanford)	Jan Hendrik de Boer (Delft)	Frank H. Healy, Jr. (Lever Brothers)
1965	39	Clarkson	Egon Matijevic (Clarkson)	Aharon Katchalsky (Weizmann Institute)	Stanley G. Mason (McGill)
1966	40	Wisconsin	John D. Ferry (Wisconsin)	Manfred Eigen (Max Planck Institute, Göttingen)	Milton Kerker (Clarkson)
1967	41	SUNY Buffalo	Robert J. Good (SUNY Buffalo)	Albert E. Alexander (Sydney)	B. Roger Ray (Washington State)
1968	42	IIT Chicago	Kurt Gutfreund (IIT Chicago)	H. Fujita (Osaka)	Fredrick N. Fowkes (Lehigh)
1969	43	Case Western	Tomlinson Fort Jr. (Case Western)	Douglas H. Everett (Bristol)	E. Desmond Goddard (Unilever)

Nagarajan; One Hundred Years of Colloid Symposia: Looking Back and Looking Forward
ACS Symposium Series; American Chemical Society: Washington, DC, 0.

Table A1. (Continued). Hundred Years of Colloid Symposia Organization

Year	*Number*	*Location*	*Symposium Chair*	*Foreign Honoree / Plenary Lecturer*	*COLL Division Chair*
1970	44	Lehigh	Albert C. Zettlemoyer (Lehigh)	Boris V. Derjaguin (USSR Academy of Sciences) George M. Schwab (Munich) John C. Helmer (Varian Associates)	Egon Matijevic (Clarkson)
1971	45	Georgia Tech	Robert A. Pierotti (Georgia Tech)	Andre Bellemans (Brussels) George D. Halesy Jr. (Washington)	Arthur W. Adamson (USC)
1972	46	U Mass Amherst	Robert L. Rowell (U Mass Amherst)	Robert H. Ottewill (Bristol)	Robert S. Hansen (Iowa State)
1973	47	Carleton University, Ottawa	James M. Holmes (Carleton University)	Kenneth S. W. Sing (Brunel University)	Howard B. Klevens (Mellon Institute)
1974	48	Texas-Austin	William H. Wade (Texas-Austin)	Douglas H. Everett (Bristol)	Paul Becher (ICI Americas Inc)
1975	49	Clarkson	Egon Matijevic (Clarkson)	Jochen H. Block (Fritz Haber Institute, Berlin) Brian A. Pethica (Unilever Research, UK)	Gabor A. Somorjai (UC Berkeley)
1976	50	San Juan, Puerto Rico	Milton Kerker (Clarkson)	Stanley G. Mason (McGill) Gabor A. Somorjai (UC Berkeley) Milton Kerker (Clarkson) James F. Danielli (WPI) Robert H. Ottewill (Bristol) Glenn H. Brown (Kent State) Robert L. Burwell Jr. (Northwestern) Ilya Prigogine (Brussels) Kamil Kleir (Lehigh) David Tabor (Cambridge)	William H. Wade (Texas-Austin)
1977	51	SUNY Buffalo	Robert J. Good (SUNY Buffalo)	Jan T. G. Overbeek (Utrecht) V. Adrian Parsegian (NIH)	Tomlinson Fort, Jr. (Carnegie-Mellon)
1978	52	Tennessee ORNL	Elmer L. Fuller, Jr. (ORNL)	Lisbeth Ter-Minassian-Saraga (CNRS, France) Geoffrey D. Parfitt (Tioxide International, UK)	W. Keith Hall (Wisconsin-Milwaukee)
1979	53	Missouri-Rolla	Stig E. Friberg (Missouri)	Barry W. Ninham (Australian National University) Eric J. Clayfield (Shell Research Center, UK)	Joseph P. Kratochvil (Clarkson)
1980	54	Lehigh	Henry Leidheiser, Jr. (Lehigh)	Alexander S. Dunn (Manchester)	John T. Yates, Jr. (NIST)

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Table A1. (Continued). Hundred Years of Colloid Symposia Organization

Year	*Number*	*Location*	*Symposium Chair*	*Foreign Honoree / Plenary Lecturer*	*COLL Division Chair*
1981	55	Case-Western	J. Adin Mann, Jr. (Case Western)	A. Wilhelm Neumann (Toronto) Hassan A. Hamza (CANMET Western Research Lab) H. Ted Davis (Minnesota) L. E. "Skip" Scriven (Minnesota)	J. Adin Mann, Jr. (Case Western)
1982	56	Virginia Tech	James P. Wightman (Virginia Tech)	John M. Thomas (Cambridge)	Gary L. Haller (Yale)
1983	57	Toronto	A. Wilhelm Neumann (Toronto)	Alex Silberberg (Weizmann Institute) Norio Ise (Kyoto)	Avrom I. Medalia (Cabot Corp)
1984	58	Carnegie-Mellon	Geoffrey D. Parfitt (Carnegie-Mellon)	Gerhard Ertl (Munich) Robert H. Ottewill (Bristol) Alex Silberberg (Weizmann Institute)	Robert R. Rye (Sandia National Lab)
1985	59	Clarkson	Egon Matijevic (Clarkson)	Ivan Giaever (RPI) Pierre G. deGennes (College de France)	D. Wayne Goodman (Texas A&M)
1986	60	Georgia Tech	Michael J. Matteson (Georgia Tech)	Kenneth S. W. Sing (Brunel) John W. Vanderhoff (Lehigh)	Robert L. Rowell (U Mass-Amherst)
1987	61	Michigan	Erdogan Gulari (Michigan)	Ralph Christoffersen (Upjohn) Milton Kerker (Clarkson)	Alexis T. Bell (UC Berkeley)
1988	62	Penn State	R. Nagarajan William A. Steele Richard Hogg (Penn State)	Dominique Langevin (ENS Paris) Howard Brenner (MIT) Robert Evans (Bristol)	Raj Rajagopalan (Houston)
1989	63	Washington	John C. Berg (Washington)	Egon Matijevic (Clarkson) Jacob N. Israelachvili (UC Santa Barbara)	John L. Gland (Exxon)
1990	64	Lehigh	M. S. El-Aasser Gary W. Simmons (Lehigh)	Pierre G. deGennes (College de France)	Barbara J. Kinzig (Midwest Research Institute)
1991	65	Oklahoma	John F. Scamehorn Jeffrey H. Harwell (Oklahoma)	Robert Schechter (Texas-Austin) D. Fennel Evans (Minnesota)	Edwin L. Kugler (West Virginia)

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Table A1. (Continued). Hundred Years of Colloid Symposia Organization

Year	*Number*	*Location*	*Symposium Chair*	*Foreign Honoree / Plenary Lecturer*	*COLL Division Chair*
1992	66	West Virginia	Duane H. Smith Martin Ferer (West Virginia)	H. Eugene Stanley (Boston University) John T. Yates Jr (University of Pittsburgh)	David W. Osborne (Calgon Vestal Lab)
1993	67	Toronto	Michael L. Hair (Xerox) A. Wilhelm Neumann (Toronto)	Barry W. Ninham (Australian National University) Michael L. Klein (University of Pennsylvania)	Charles T. Campbell (Washington)
1994	68	Stanford	Alice P. Gast (Stanford)	George M. Whitesides (Harvard) Rudolf Klein (Konstanz)	Raymond A. Mackay (Clarkson)
1995	69	Utah	Joseph D. Andrade Karin D. Caldwell Terry A. Ring (Utah)	Helmut Ringsdorf (Mainz) Brian Vincent (Bristol)	Jay B. Benzinger (Princeton)
1996	70	Clarkson	Stig E. Friberg (Clarkson)	Peter F. Davies (Chicago) Arnim Henglein (Berlin) John H. Seinfeld (Cal Tech)	Ana Morfesis (PPG Industries, Pittsburgh)
1997	71	Delaware	Eric W. Kaler (Delaware) Ralph D. Nelson Jr. (DuPont)	Matthew Tirrell (Minnesota) Peter Pusey (Edinburg)	Noel H. Turner (Naval Research Lab)
1998	72	Penn State	R. Nagarajan William A. Steele K. Osseo Asare (Penn State)	Toyoki Kunitake (Kyushu) Mats Almgren (Uppsala)	John Texter (Eastman Kodak, Rochester)
1999	73	MIT	Paul E. Labinis T. Alan Hatton (MIT)	Stephen Mann (Bristol) Mario Corti (University of Milan)	Barbara K. Warren (Union Carbide Corp)
2000	74	Lehigh	Mohammed. S. El-Aasser Maria Santore (Lehigh)	Pierre G. deGennes (College de France) Matthew Tirrell (UC Santa Barbara) Erich Sackmann (TU München)	Alice P. Gast (Stanford)
2001	75	Carnegie-Mellon	Robert D. Tilton Steven Garoff (Carnegie-Mellon)	William Gelbart (UCLA) Jacob N. Israelachvili (UC Santa Barbara) David A. Weitz (Harvard)	Arthur T. Hubbard (Cincinnati)

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Table A1. (Continued). Hundred Years of Colloid Symposia Organization

Year	*Number*	*Location*	*Symposium Chair*	*Foreign Honoree / Plenary Lecturer*	*COLL Division Chair*
2002	76	Michigan	R. Nagarajan (Penn State) Stacy G. Bike (Michigan)	Adi Eisenberg (McGill) Alice P. Gast (MIT)	Darsh T. Wasan (IIT Chicago)
2003	77	Georgia Tech	Sotira Z. Yiacoumi (Georgia Tech) Costas Tsouris (ORNL)	J. Fraser Stoddart (UCLA) Jill Trewhella (Los Alamos National Laboratory)	Andrew J. Gellman (Carnegie-Mellon)
2004	78	Yale	Menachem Elimelech John Y. Walz (Yale)	Robert S. Langer (MIT) Roger Horn (U South Australia) Martin J. Klein (Yale)	James A. Schwarz (Syracuse)
2005	79	Clarkson	Janos H. Fendler (Clarkson)	John M. Thomas (Cambridge) Gabor A. Somorjai (UC Berkeley) Marie-Paule Pileni (U Pierre et Marie Curie)	Maria Santore (U Mass-Amherst)
2006	80	Colorado-Boulder	Daniel K. Schwartz (Colorado-Boulder) David W. M. Marr (Colorado School of Mines)	Virgil Percec (U Penn) Sid Nagel (Chicago) Daan Frenkel (Utrecht, Amsterdam)	Eric W. Kaler (Delaware)
2007	81	Delaware	Eric W. Kaler (Delaware)	Samuel Safran (Weizmann Institute) Henk N. W. Lekkerkerker (Utrecht)	Francisco Zaera (UC Riverside)
2008	82	NC State	Orlin D. Velev Peter K. Kilpatrick (NC State)	Eric W. Kaler (Delaware) David A. Weitz (Harvard)	Robert D. Tilton (Carnegie-Mellon)
2009	83	Columbia	P. Somasundaran (Columbia)	Gabor A. Somorjai (UC Berkeley) Yoshio Okahata (Yamagata) Ivar Giaever (RPI, Oslo) Matt Trau (Queensland) Brian J. Vincent (Bristol)	Deborah E. Leckband (Illinois)
2010	84	Akron	H. Michael Cheung (Akron) J. Adin Mann Jr. (Case Western)	William B. Russel (Princeton) Steven Granick (Illinois)	Wilfred T. Tysoe (Wisconsin-Milwaukee)

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Table A1. (Continued). Hundred Years of Colloid Symposia Organization

Year	*Number*	*Location*	*Symposium Chair*	*Foreign Honoree / Plenary Lecturer*	*COLL Division Chair*
2011	85	McGill	Natalie Tufenkji Theo G. M. van de Ven (McGill)	Toshio Yanagida (Osaka) Alejandro D. Rey (McGill) Frank Caruso (Melbourne)	John Y. Walz (Yale)
2012	86	Johns Hopkins	Michael A. Bevan Joelle Frechette (Johns Hopkins)	Arjun G. Yodh (U Penn) Charles F. Zukoski (Stanford)	Vicki H. Grassian (Iowa State)
2013	87	UC Riverside	Sharon L. Walker Francisco Zaera (UC Riverside)	Joanna Aizenberg (Harvard) Barbara J. Finlayson-Pitts (UC Irvine)	William A. Ducker (Virginia Tech)
2014	88	U Penn	John C. Crocker Kathleen J. Stebe Arjun G. Yodh (U Penn)	David A. Weitz (Harvard) Daan Frenkel (Cambridge)	Michael Trenary (Illinois-Chicago)
2015	89	Carnegie-Mellon	Robert D. Tilton Steven Garoff James W. Schneider (Carnegie Mellon)	David J. Pine (New York U) Tejal A. Desai (UC San Francisco)	Robert J. Hammers (Wisconsin)
2016	90	Harvard	R. Nagarajan (US Army Soldier Center) David A. Weitz (Harvard) Joyce Y. Wong (Boston U)	Françoise Brochard-Wyart (Institute Curie) Eugenia Kumacheva (U Toronto)	Daniel K. Schwartz (Colorado-Boulder)
2017	91	CUNY	Ilona Kretzschmar Raymond S. Tu George John (CUNY)	Kathleen J. Stebe (U Penn) Markus Antonietti (Max Planck Institute-Colloids and Interfaces)	D. Howard Fairbrother (Johns Hopkins)

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Table A1. (Continued). Hundred Years of Colloid Symposia Organization

Year	*Number*	*Location*	*Symposium Chair*	*Foreign Honoree / Plenary Lecturer*	*COLL Division Chair*
2018	92	Penn State	Darrel Velegol Kyle Bishop Seong H. Kim Robert E. Schaak (Penn State)	John A. Rogers (Northwestern) Sharon C. Glotzer (Michigan)	Eric Borguet (Temple)
2019	93	Georgia Tech	Valeria Milam Sven H. Behrens Seth R. Marder (Georgia Tech)	Jennifer A. Lewis (Harvard U) Juan de Pablo (U Chicago)	Lorena Tribe (Penn State)
2020	94	Rice Scaled down virtual meeting due to COVID	Sibani L. Biswal Christy Landes Matteo Pasquali (Rice)	-	Kathleen J. Stebe (U Penn)
2021	95	COLL Division Virtual meeting due to COVID	R. Nagarajan (US Army Soldier Center) Sibani L. Biswal (Rice) Matthew Helgeson (UC Santa Barbara)	Catherine J. Murphy (Illinois) Maria Santore (U Mass-Amherst)	Matthew L. Lynch (Procter & Gamble)
2022	96	Colorado School of Mines	Ning Wu David W. M. Marr Carolyn A. Koh David T. Wu (Colorado School of Mines)	Naomi J. Halas (Rice) Bradley Nelson (ETH Zurich)	James D. Batteas (Texas A&M)
2023	97	NC State	Lilian Hsiao Orlin D. Velev (NC State)	Cari S. Dutcher (Minnesota) Sibani L. Biswal (Rice)	Lauren D. Zarzar (Penn State)

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Table A2. Colloid Symposium Committee Chairs[a]

Year(s)	*Name of Chair*	*Affiliation of Chair*
1923	J. Howard Mathews[b]	University of Wisconsin
1924-1925	Harry N. Holmes[c]	Oberlin College
1926-1946	Harry B. Weiser	The Rice Institute
1947-1951	John W. Williams	University of Wisconsin
1952-1958	Winfred O. Milligan	The Rice Institute
1959-1963	B. Roger Ray	Washington State University
1964-1966	Eric Hutchinson	Stanford University
1967-1968	Paul Becher	Atlas Research Center, Wilmington DE
1969-1972	Roger S. Porter	University of Massachusetts Amherst
1973-1974	James C. Melrose	Mobil Oil Corporation
1975-1976	Henry Leidheiser, Jr.	Lehigh University
1977-1979	Egon Matijevic	Clarkson University
1980-1983	William A. Steele	Pennsylvania State University
1984-1989	James P. Wightman	Virginia Tech
1990-1993	?	
1994-1997	Michael Hair	Xerox Corporation
1998-2001	David Devore	Henkel Corporation
2001-2004	Eric Kaler	University of Delaware
2004-2007	Robert Tilton	Carnegie-Mellon University
2008-2012	Eric Furst	University of Delaware
2013-2016	Michael Bevan	Johns Hopkins University
2017-2021	James Schneider	Carnegie-Mellon University
2022-	Raymond Tu	City University of New York

[a] The first four Colloid symposia were sponsored by the National Research Council (NRC) Committee on Colloid Chemistry. The Colloid Division within ACS was created in 1926. From the 5th symposium onwards, Colloid Symposia were sponsored by the Division under the leadership of the Colloid Symposium Committee of the Division. [b] Organizer of the 1st symposium, no Symposium Committee at this stage. [c] Chair of NRC Committee on Colloid Chemistry responsible for symposium content.

Table A3. Victor K. LaMer Award Recipients[a]

Year	*Award Recipient*	*Doctoral Institution*
1970	Charles W. Querfeld	Physics, Clarkson College of Technology
1971	Edward McCafferty	Chemistry, Lehigh University
1972	Donald E. Brooks	Biochemistry, University of Oregon
1973	W. Henry Weinberg	Chem. Eng., UC Berkeley
1974	Stephen L. Brenner	Chemistry, Indiana University
1975	Michele Flicker	Chemistry, MIT
1976	Felix T. Hong	Biophysics, Rockefeller University
1977	Hung Dah Shih	Materials Sci., SUNY, Stony Brook
1978	Frederick A. Putnam	Chem. Eng., Carnegie-Mellon University
1979	Eduardo D. Glandt	Chem. Eng., University of Pennsylvania
1980	Wilson Ho	Physics, University of Pennsylvania
1981	Michel Deeba	Chemistry, University of Wisconsin-Milwaukee
1982	Mark A. Barteau	Chem. Eng., Stanford University
1983	David G. Welkie	Materials Sci., University of Wisconsin-Madison
1984	Jeffrey H. Harwell	Petroleum Eng., University of Texas-Austin
1985	Syed Qutubuddin	Chem. Eng., Carnegie-Mellon University
1986	Manoj K. Chaudhury	Chem. Eng., SUNY, Buffalo
1987	Peter S. Kirlin	Chem. Eng., University of Delaware
1988	James P. Ebel	Chem. Eng., Carnegie-Mellon University
1989	John M. Vohs	Chem. Eng., University of Delaware
1990	Andrea K. Myers-Beaghton	Chem. Eng., Princeton University
1991	Antonios G. Mikos	Chem. Eng., Purdue University
1992	Andrew D. Johnson	Chemistry, MIT
1993	Robert D. Tilton	Chem. Eng., Stanford University
1994	Paul E. Laibinis	Chemistry, Harvard University
1995	Vicki L. Colvin	Chemistry, UC Berkeley
1996	Frank M. Zimmerman	Physics, Cornell University
1997	John Levins	Chem. Eng., University of Pennsylvania

Table A3. (Continued). Victor K. LaMer Award Recipients[a]

Year	*Award Recipient*	*Doctoral Institution*
1998	Darrell Velegol	Chem. Eng., Carnegie-Mellon University
1999	Younan Xia	Chemistry, Harvard University
2000	Yunfeng Lu	Chem. Eng., University of New Mexico
2001	Garth J. Simpson	Chemistry & Biochemistry, University of Colorado
2002	Christopher D. Zangmeister	Chemistry, University of Arizona
2003	Teri Wang Odom	Chemistry, Harvard University
2004	James E. Smay	Materials Sci. & Eng., University of Illinois
2005	Christy L. Haynes	Chemistry, Northwestern University
2006	Jwa-Min Nam	Chemistry, Northwestern University
2007	Amanda J. Haes	Chemistry, Northwestern University
2008	Ali Khademhosseini	Chem. Eng., MIT
2009	Liangfang Zhang	Chem. & Biomol. Eng., University of Illinois
2010	Daeyeon Lee	Chem. Eng., MIT
2011	Matthew E. Helgeson	Chem. Eng., University of Delaware
2012	Bo Wang	Chem. & Biomol. Eng., University of Illinois
2013	Rafal Klajn	Chem. & Biol. Eng., Northwestern University
2014	Daniel Beltrán-Villegas	Chem. & Biomol. Eng., Johns Hopkins University
2015	Qian Chen	Materials Sci. & Eng., University of Illinois
2016	Michel Personick	Chemistry, Northwestern University
2017	Chi-Jen Shih	Chemical Eng., MIT
2018	Kaifeng Wu	Chemistry, Emory University
2019	Rong Ye	Chemistry, University of California-Berkeley
2020	Xiao Su	Chem. Eng., MIT
2021	Rose Cersonsky	Chem. Eng., University of Michigan
2022	Rebecca Pinals	Chem. & Biomol. Eng., UC Berkeley
2023	Haichao Wu	Chem. Eng., University of Colorado at Boulder

[a] The award is for an outstanding Ph.D. thesis accepted by a US or Canadian university during the three-year period prior to the award year. The first award presented in 1970. The listing includes the Year, and the Name/Academic Department/Institution of the Award Recipient.

Table A4. Unilever Award Recipients[a]

Year	*Award Recipient*	*Institution*
2004	Christine Keating	Chemistry, Pennsylvania State University
2005	Yunfeng Lu	Chem. Eng., Tulane University
2006	Bartosz A. Grzybowski	Chemistry, Northwestern University
2007	Michael Strano	Chem. Eng., University of Illinois
2008	David S. Ginger	Chemistry, University of Washington
2009	Suljo Linic	Chem. Eng., University of Michigan
2010	Ali Khademhosseini	Medicine, Harvard University
2011	Ryan Hayward	Chem. & Biol. Eng., U. Mass-Amherst
2012	Liangfang Zhang	Nano Eng., UC San Diego
2013	Prashant K. Jain	Chemistry, University of Illinois
2014	Daeyon Lee	Chem. & Biomol. Eng., U. of Pennsylvania
2015	Jill Millstone	Chemistry, University of Pittsburgh
2016	Matthew E. Helgeson	Chem. Eng., UC Santa Barbara
2017	Robert Macfarlane	Materials Sci. & Eng., MIT
2018	Qian Chen	Materials Sci. & Eng., University of Illinois
2019	Lauren Zarzar	Chemistry, Pennsylvania State University
2020	Sujit S. Datta	Chem. & Biol. Eng., Princeton University
2021	Lilian Hsiao	Chem. & Biomol. Eng., NC State University
2022	Amir Sheikhi	Chem. Eng., Pennsylvania State University
2023	Xiao Su	Chem. & Biomol. Eng., University of Illinois

[a] This award is to recognize fundamental work in colloid or surfactant science carried out in North America by researchers in the early stages of their careers. The award is sponsored by the Unilever Corporation and the first award was presented in 2004. The listing includes the Year of Award and the Name/Academic Department/Institution of the Award Recipient.

References

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3. Kerker, M. Some historical ruminations on the ACS Colloid and Surface Chemistry Symposium. *J. Colloid Interface Sci.* **2005**, *291*, 606–609.