

Report on Symposium on Teaching Aspects in Chemistry: Curriculum Developments in Analytical Chemistry, Pacificchem 2000, Honolulu, December 14-19, 2000.

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This symposium of three half-day sessions was organized by Gary Christian (University of Washington, American Chemical Society), Koichi Oguma (Chiba University, Chemical Society of Japan), and Robert Cattrall (Latrobe University, Royal Australian Chemical Institute). The goal was to explore curriculum development and new modes of teaching of analytical chemistry in the three countries and others from contributors. Support was provided the American Chemical Society and the Division of Analytical Chemistry of the ACS in the U.S., the Analytical Chemistry Division of the RACI in Australia, and Sanuki Industry Co., Ltd., Kohkanankeisoko Corp., Tokyo Kasei Kogyo Co., Ltd. and Soma Optics, Ltd. in Japan.

There were twenty-two papers for the symposium covering a wide range of topics, from nationwide curriculum development to the needs of industry in training. Following are titles and authors, with email contacts for obtaining abstracts or more detailed information:

1. A Brief History of Time: Where Did Analytical Chemistry Come From?
Gary D. Christian, Department of Chemistry, University of Washington, Box 351700, Seattle, WA 98195-1700, USA, 206-685-3478, christian@chem.washington.edu.
2. The Standard Curriculum on Analytical Chemistry in Japan.
Koichi Oguma, Chiba University, 1-33 Yayoi-cho, Inage-ku, Department of Materials Technology, Faculty of Engineering, Chiba, 263-8522, Japan, 81-43-290-3502, oguma@galaxy.tc.chiba-u.ac.jp.
3. Quantitative, Instrumental Analytical Practical Work, Industry Based Learning and Employment.
Reg Cross, PO Box 218, Hawthorn, Victoria, Australia, 3122, 61-3-9819-0834, rcross@swin.edu.au.
4. Teaching Analytical Chemistry: What Does Industry Need?
Alan Ullman, Glenn D. Boutilier, Procter & Gamble Company, 6100 Center Hill Avenue, Cincinnati, OH 45224, USA, 513-634-4472, ullman.ah@pg.com.

5. Connection Between Fundamental and Applied Analytical Chemistry.
Kunio Ohzeki, Hirosaki University, 3 Bunkyo-cho, Materials Science and Technology, Hirosaki, Aomori, Japan,
81-172-39-3541, ohzeki@cc.hirosaki-u.ac.jp.
6. Mineral Analysis in Analytical Chemistry Teaching – Enhanced Employment Opportunities for Chemistry Graduates.
David N. Phillips, School of Applied Chemistry, PO Box U 1987, Perth, Western Australia, Australia, 6845,
61-8-9266-2300, D.Phillips@info.curtin.edu.au
7. MCPWeb: An Interactive, Web-Based Materials Characterization Project at the University of Arizona.
Jeanne E. Pemberton, Neil R. Mackie, University of Arizona, 1306 E. University Blvd., Department of Chemistry, Tucson, AZ 85721, USA,
520-621-8248, pembertn@u.arizona.edu.
8. Analytical Chemistry: The Lighter Side.
Charles Lucy, University of Alberta, Chemistry Center, Department of Chemistry, Edmonton, AB, Canada, T6G 2G2,
780-492-8231, charles.lucy@ualberta.ca.
9. Ph.D.: Path to a Career or to a Job?
Gary Hieftje, A150 chemistry Building, Indiana University, Bloomington, IN 47405, USA,
812-855-0958, hieftje@indiana.edu.
10. Analytical Chemistry Teaching in Materials Science to Life Sciences: What is Basic and Essential, and How to Select the Topics in Analytical Chemistry for Undergraduate Teaching? Makoto Takagi, Kyushu University, Hakozaki, Higashi-ku, Department of Chemical Systems and Engineering, Fukuoka, Japan,
81-92-642-3603, takagtcn@mbox.nc.kyushu-u.ac.jp.
11. Flexible Learning Methods for Teaching Data Analysis, Quality Assurance Principles and Chemometrics to Analytical Chemistry Students.
Mark Selby, Queensland University of Technology, School of Physical Sciences, Brisbane, Queensland, 4000, Australia,
61-7-3864-1521, m.selby@qut.edu.au.
12. Problem-Based Learning in Analytical Chemistry.
Thomas Wenzel, Bates College, Chemistry, Lewiston, Maine 04240, USA,
207-786-6123, twenzel@bates.edu.

13. Status of Analytical Chemistry in the Educational Program of Industrial Chemistry in Japan.
Hideo Akaiwa, Kin-Ichi Tsunoda, Gunma University, Aramaki-cho 4-2,
Department of Chemistry, Maebashi, Gunma, Japan,
81-27-220-7019, akaiwa@sun.aramaki.gunma-u.ac.jp.
14. Using Videoconferencing and Telecommunications to Teach University Chemistry.
Kieran F. Lim, School of Biological and Chemical Sciences, Deakin University, Geelong,
Victoria, Australia, 3217,
61-3-5227-1040, lim@deakin.edu.au.
15. Quality Assurance Curricula for Chemistry Students.
David Klein, Stanley Israel, Southwest Texas State University, 601 University Dr.,
Waste Minimization and Management Research Center, San Marcos, TX 78666-
4616, USA,
512-353-7329, dk02@swt.edu.
16. Assessment of Activities Related to Curricular Development.
Theodore Kuwana, Cynthia Larive, University of Kansas, 5070 Malott Hall,
Department of Chemistry, Lawrence, KS 66045, USA,
785-864-5396, tkuwana@eureka.chem.ukans.edu.
17. Trans-disciplinary Approach through Analytical Chemistry:
Developmental Cognitive Neuro-science for Future Learning and Education.
Hideaki Koizumi, Advanced Research Laboratory, Hitachi, Ltd., General
Manager, Hatoyama, Saitama, Japan,
81-492-96-6005, hkoizumi@harl.hitachi.co.jp
18. Computer Simulation of Analytical Instruments.
Barry O'Grady V, University of Tasmania, PO Box 252-75, Chemistry, Hobart
7001, Tasmania, Australia,
61-3-6226-2858, barry.ograde@utas.edu.au.
19. Introducing Undergraduates to Contemporary Analytical Science.
Joseph Pesek, Sam P. Perone, San Jose State University, PO Box 1418,
Department of Chemistry, San Jose, CA 95192-0101, USA,
408-924-4945, jpesek@hotmail.com.
20. Analytical Chemistry and Chemical Analysis.
Yohichi Gohshi, National Institute for Environmental Studies, 16-2 Onogawa,
Tsukuba, Japan,
81-298-51-2854, gohshi@nies.go.jp.
21. A Virtual Instrument for Stripping Potentiometry.
David Davey, Christopher Chow, John Bannigan, Jeremy Lucas, Spas Kolev,

University of South Australia, Mawson Lakes Boulevard, Mawson Lakes, South Australia 5095, Australia, Analysis and Sensors Group, School of Chemical Technology, Adelaide, Australia,
61-8-8302-3668, david.davey@unisa.edu.au.

22. Back to Basics in the First-Year Quantitative Analysis Laboratory.
Morton Z. Hoffman, Alan D. Crosby, Boston University, 590 Commonwealth Avenue, Department of Chemistry, Boston, MA 02215, USA,
617-353-6466, hoffman@chem.bu.edu.

A few highlights from each country:

Oguma (2) described efforts initiated by the Japan Society for Analytical Chemistry to establish a new and common curriculum of analytical chemistry for undergraduate students in Japan. Emphasis will be on methods of instrumental analysis such as spectroscopic, automated, hyphenated, and biological techniques, as well as quality assurance and quality control of analysis. Publication of a standard textbook is planned on the basis of the standard curriculum. Akaiwa (13) spoke of educational reform in Japan and the need to standardize and accredit educational programs, especially for engineers.

Lim (14) described the use of videoconferencing to provide broader access to courses, especially upper division classes, at the three linked campuses of Deakin University. Modern telecommunication technologies can bring together students and teachers at physically disparate locations into a single, real-time interactive electronic virtual classroom. Asynchronous computer conferencing is used for out-of-class student discussions, study groups, and delivery of lecture resources. O'Grady (25) reported on his use of computer simulation of hardware for dealing with resource limitations in instrumental analysis.

Kuwana (23) provided an update on the NSF supported workshops and the subsequent report on curricular developments in the analytical sciences, with an emphasis on problem-based learning. Ullman (4) presented the needs of the chemical industry in the training of analytical chemists, emphasizing the importance of problem solving skill, as well as effective communication.

Many of the other presentations provided specific examples of implementing some of the above recommendations, as well as additional novel approaches for teaching, and options for students.

The University of Arizona has a unique materials characterization lab, and they have developed a prototype of a Web-based, interactive version, intended to supplement the more conventional laboratory-based training in undergraduate analytical chemistry. The following description is provided by Jeanne Pemberton (7).