

Mei-Hung Chiu's Profile

Mei-Hung Chiu is a Distinguished Professor of Science Education at the Graduate Institute of Science Education (GISE) of the National Taiwan Normal University (NTNU). She has a BS in chemistry (National Taiwan Normal University), Ed.M. and Ed.D. from Harvard University. She served as the President of National Association for Research in Science Teaching based in the USA from 2016- 2017. She was the chair of Committee on Chemistry Education of International Union of Pure and Applied Chemistry (IUPAC) from 2011-2014. Currently, she is an elected Bureau member and Executive Committee member of IUPAC.



She has published articles about science curriculum, students' conceptual understanding and changes as well as mental models of scientific phenomenon and modeling-based text in science learning in international well-known journals. She also co-edited or edited four books, namely *Celebrating the 100th Anniversary of Madame Marie Sklodowska Curie's Nobel Prize in Chemistry* by Sense in 2012; *Chemical Education and Sustainability in the Global Age* published by Springer in 2013, *Science Education Research and Practice in Taiwan: Challenges and Opportunities* by Springer in 2016; *Science Education Research and Practice in Asia: Challenges and Opportunities* by Springer in 2016.

Her recent research topics include (1) eliciting students' conceptional construction and conceptual change, (2) promoting students' perceptions on scientific models and developing model-based inquiry and modeling competence, (3) exploring whether facial microexpression state (FMES) changes can be used to identify moments of conceptual conflict scenarios, one of the pathways to conceptual change in science learning, and (4) the use of augmented reality for learning structures of organic compounds.

She was a recipient of the Distinguished Contribution to Chemical Education Award from the Federation of Asian Chemical Societies (FACS) in 2009. With her deep involvement in science education research and practice, she was a recipient of the Distinguished Contribution to Science Education Award from Eastern-Asian Science Education Association (EASE) in 2016. In addition, she was a recipient of the 2021 Distinguished Woman in Chemistry or Chemical Engineering from IUPAC.

Finally, Dr. Chiu was actively involved in research in science education, namely, published more than 100 peer reviewed journal articles (in English and Chinese), over 150 conference presentations (in English, more than 35 plenary/keynote speeches), four edited books (in English, one was ranked as the most downloaded book in educational series in 2017 and 2018 published by Springer), three patents in innovative technology in science education, and supervised 100 advisees to receive their advanced degrees (19 in PhD and 81 in MS) in science education.

Educational experiences

Department of Chemistry, National Taiwan Normal University, BS (1980)
Harvard Graduate School of Education, Ed.M. (Technology in Education, 1986)
Harvard Graduate School of Education, Ed.D. (Human Development and Psychology, 1990)

Working experiences

1990-1991 Research Associate, Learning Research and Development Center, University of Pittsburgh, USA
1991-current Associate Professor (1991-2000), Professor (2000-2015), Outstanding Professor (2015-2017), Distinguished Professor (2018-current), Graduate School of Science Education, National Taiwan Normal University, Taiwan
1997-2003 Director, Graduate School of Science Education, National Taiwan Normal University, Taiwan

Honors

2009 A recipient of the Federation of Asian Chemical Societies (FACS) Award for Distinguished Contribution to the Advancement in Chemical Education
2010~ Research Award from National Science Council and Ministry of Science and Technology, Taiwan
2014-2021 Outstanding Research Award, National Taiwan Normal University (NTNU)
2015 Keynote speaker at IUPAC GA and World Chemistry Congress, Busan, Korea
2015 Invited speaker for Gordon Research Conference (Chemistry Education Research and Practice) held at Bates College, in Maine, June 21-26, 2015.
2016 A recipient of the Distinguished Contribution to Science Education Award from Eastern-Asian Science Education Association (EASE)
2017 Plenary speaker at IUPAC GA and World Chemistry Congress, the first chemistry education researcher presented at the Congress, São Paulo, Brazil, 9-14 July 2017.
2018-21 Received Distinguished Professorship in research from NTNU
2019 Invited speaker, the IUPAC's closing ceremony of International Year of the Periodic Table of Chemical Elements (IYPT) in Tokyo, Japan, Dec 4.
2020 Invited speaker, U.S-Finnish Partnerships for International Research and Education (PIRE) Learning Science Answering the Challenges for the Future of Science Education. Academy of Finland, Helsinki, Finland, 20 January 2020.
2020 Invited speaker, the US National Academies Gender Gap Webinar, 1 Sept.
2020 Invited speaker, the International Conference on Women in Science and Technology, Asia and Pacific National Network Meeting and International Conference on Women in Science and Technology, 24-25 October, Taipei, Taiwan.
2021 Distinguished Woman in Chemistry or Chemical Engineering from IUPAC.

Services and leadership

IUPAC

- National Representative to Committee of Chemistry Education (2002-07, 2018-21)
- Titular member of Committee of Chemistry Education (2008-2011, 2016-17)
- Chair, IUPAC Committee on Chemistry Education (CCE) (2012-15)
- Chair, the Subcommittee on Chemistry Education for Development (2006-2013)
- Elected member of Bureau (2016-2019, 2020-2023)
- Member of Executive Committee of IUPAC (2016-2019, 2020-2023)
- Held the IUPAC International Conference on Chemical Education (ICCE) in Taiwan (2010)
- Projects: (* chair of the project)
 - Young Ambassadors for Chemistry (YAC) (2003-055-1-050 & (2015-058-2-050)
(involved in the YAC for more than 15 years, Publications were revealed in *Chemistry International*)

and *Journal of Chemical Education*) (Launched YAC in Cambodia, Croatia, Ethiopia, Korea, Malaysia, Mexico, Mongolia, Panama, the Philippines, etc.)

- Flying Chemistry Educators Program (e.g., 2007-018-1-050, Launched FCEP in Croatia, Ethiopia, Korea, Malaysia, Mexico, New Zealand, Panama, the Philippines, Sri Lanka, etc.)
- International Year of Chemistry (IYC)- Initial strategy planning (2007-011-1-050)
- Towards an improved teaching and learning of chemistry at the tertiary level in the Philippines (2007-018-1-050)
- Development of International Standards for Chemistry Education (2013-022-2-050)
- Enhancing the capacity to provide quality chemistry education at secondary and tertiary levels in Ethiopia (2010-025-1-050)
- *A Global Approach to the Gender Gap in Mathematical and Natural Sciences: how to measure it, how to reduce it? - IUPAC's Role in ICSU parent project (2017-007-1-020, 3-year project)

This project covers IUPAC's contributions to the ICSU Project "A Global Approach to the Gender Gap in Mathematical and Natural Sciences: how to measure it, how to reduce it?" granted in Feb 2017. To encourage girls and young women to study and work in science, a global survey on female scientists and mathematicians covering background, career, experiences, and attitudes about gender were conducted. This joint project involves: International Mathematics Union (lead 1), IUPAC (lead 2), IUPAP, IAU, and IUBS as supporting Unions to collaborate on the global survey, a joint study on publication patterns, and a collection of good practices. VISIT <https://doi.org/10.5281/zenodo.3697222> for full report of the project. Publications were reported on journals, including *Chemistry International*.

- A member of the project titled Learning objectives and strategies for infusing systems thinking into (post)-secondary general chemistry education. (2017-010-1-050). A paper appeared in the Special issue on Reimagining Chemistry Education: Systems Thinking, and Green and Sustainable Chemistry of *Journal of Chemical Education*, 96 (12), 2814-2824.
- A resource expert for Young Ambassadors for Chemistry (YAC) in Mongolia (2018-015-2-050)
- The Inter-union International Management Committee for the International Year of the Periodic Table of Chemical Elements Management Committee member
- *The Gender Gap in Chemistry-Building on the ISC Gender Gap Project (co-chair with Mark Cesa, former IUPAC President, 2020-016-3-020)

This project covers two phases including: The first phase of the [project](#) was conducted during 2017-2019 (IUPAC [project 2017-007-1-020](#)) with the International Mathematical Union as lead 1 and IUPAC as lead 2 along with 11 other international scientific unions. As an extension, part (1) of this project aims for three priorities: a) to use current technology to provide data access by the unions to the data collected in the Global Survey of Scientists, while protecting the privacy of the respondents to the survey; b) to maintain and develop the interactive tools about publications and the data base of good practices; and c) to continue research on the open problems identified by the project. Part 2 will focus on three activities: a) Query of the results of the Gender Gap project survey to further elucidate the situation with respect to chemistry; b) Further study of publication patterns in chemistry journals; and c) Identify good practice initiatives in chemistry.

National Association for Research in Science Teaching (NARST based in USA))

- International Coordinator (2008-2010)
- Initiated Linking Science Educators Program for promoting science education in developing countries
- President of the NARST (2016-2017) (the first president from a non-English speaking country)

Chemical Society Located in Taipei

- National representative to IUPAC (2002-)
- Chair of Committee on Chemistry Education (2010-)
- Chair, Projects on celebrating International Year of the Periodic Table of Chemical Elements (IYPT) sponsored by the Ministry of Science and Technology, Taiwan

Asia-Pacific Economic Cooperation (APEC)

- Project Overseer: APEC Cross-Border Human Capacity Building for Globalized Scientific Literacy for Future Citizenship: Phase 1_The Best Practice Models for Innovative STEM+ Education for Teacher Professional Development (2018-2019)
- Project Overseer: APEC Cross-Border Human Capacity Building for Globalized Scientific Literacy for Future Citizenship: Phase 2_Longitudinal Exchange and Community Formation of STEM+ Education for School Girls, Women, and Teacher Professional Development (2019-2021)

Editors and Board members of Professional Journals

- Associate Editor, *Journal of Research in Science Teaching* (SSCI), National Association for Research in Science Teaching (USA) (2010-2014)
- Editorial board, *Chemical Education Research and Practice* (SSCI), Royal Society of Chemistry (2020-)
- Editorial board, Springer book series of *Models and Modeling in Science Education*. (2018-)
- Editorial board, *International Journal of Science and Mathematics Education* (SSCI) (2003-)
- Founder and Editor-in-Chief, *Chemistry Education in Taiwan* (2015-)
- Reviewer for various international journals

Ministry of Education, Taiwan

- Committee member, Guidelines for Grades 1-12 Basic Education on chemistry
- Scientific Advisory Board member
- A member of the IChO Advisory Committee, Ministry of Education, Taiwan

National Taiwan Normal University

- Director, Graduate School of Science Education, National Taiwan Normal University, Taiwan (1996-2002)
- Administrative tasks (e.g., faculty review and curriculum committees, 1991-)
- Supervised 100 advisees to receive their degrees (19 in PhD & 81 in MS) (1992~)

Publications (since 2010-)

- Shi, F., Wang, L., Liu, X. & **Chiu, M. H.** (2021). Development and validation of an observation protocol for measuring science teachers' modeling-based teaching performance. *Journal of Research in Science Teaching*, <https://doi.org/10.1002/tea.21712> (SSCI, Impact Factor =3.87)
- Liaw, H., Yu, Y., Chou, C.; & **Chiu, M. H.*** (2020). Relationships between Facial Expressions, Prior Knowledge, and Multiple Representations: a Case of Conceptual Change for Kinematics Instruction. *Journal of Science Education and Technology*. (SSCI, Impact Factor =2.41)
- Chiu, M. H.***, & Cesa, M. (2020, Jul). Gender Gap in Science: A Global Approach to the Gender Gap in Mathematical, Computing, and Natural Sciences: How to Measure it, How to Reduce It?. *Chemistry International*, 42(3), 16-21.
- Chiu, M. H.***, Roy, M-F., Gledhill, I. M. A., Ivie (2019). Are we all ready to get rid of gender inequality? L'Actualité Chimique , N° 442, July-August.
- Gledhill, I., Roy, **M. F.**, **Chiu, M. H.**, Ivie, R., Ponce-Dawson, S., & Mihaljević, H. (2019, Apr). A global approach to the gender gap in mathematical, computing and natural sciences: How to measure it, how to reduce it?. *South African Journal of Science*, 115(3-4), 1-3.
- Chiu, M. H.***, & Lin, J. W. (2019, Nov). Modeling competence in science education. *Disciplinary and Interdisciplinary Science Education Research*, 1(1), 1-11.

- Chiu, M. H.***, Liaw, H. L., Yu, Y. R., & Chou, C. C. (2019). Facial micro-expression states as an indicator for conceptual change in students' understanding of air pressure and boiling points. *British Journal of Educational Technology*, 50(1), 469-480. DOI: 10.1111/bjet.12597. (SSCI, Impact Factor =**2.41**)
- Chiu, M. H.***, Mamlok-Naaman, R., & Apotheker, J. (2019, Oct). Identifying Systems Thinking Components in the School Science Curricular Standards of Four Countries. *Journal of Chemical Education*, 96(12), 2814-2824. (SCI/SSCI, Impact Factor =**1.770**)
- Chen, X., Chiu, M. H., & Eilks, I. (2019). An Analysis of the Orientation and Emphasis of Intended Grade-10 Chemistry Curricula as Represented in Textbooks from Different Chinese Communities. *EURASIA Journal of Mathematics, Science and Technology Education*, 15(2), em1663. DOI: <https://doi.org/10.29333/ejmste/100642> (SSCI, Impact Factor =**0.903**)
- Tsai, C. M., Chiu, M. H., Zeng, M. R., & Hsieh, T. L. (2019). The study of investigating high school students' learning performance under the instruction of model-based inquiry. *Chinese Journal of Science Education (TSSCI)*, 27(4), 207-228. DOI : 10.6173/CJSE.201912_27(4).0001
- Chiu, M. H.***, Chou, C. C., Chen, Y. H., Hung, T., Tang, W. T., Hsu, J. W., & Tsai, M. K. (2018). Model-based learning about structures and properties of chemical elements and compounds via the use of augmented realities. *Chemistry Teacher International*, 1(1), <https://doi.org/10.1515/cti-2018-0002>
- Chiu, M. H.**, Roy, M. F., & Liaw, H. M. (2018). The Gender gap in science. *Chemistry International, July-September*.
- Lin, J. W., Yen, M. H., Liang, J. C., **Chiu, M. H.***, & Guo, C. J. (2016). Examining the factors that influence students' science learning processes and their learning outcomes: 30 years of conceptual change research, *Eurasia Journal of Mathematics, Science & Technology Education*, 2(9), 2617-2646. (SSCI, Impact Factor =**1.016**)
- Yang*, K. T., Wang, T. H., & **Chiu, M. H.** (2014) How technology fosters learning: Inspiration from the 'Media Debate', *Creative Education*, 5(12), 1086-1090.
- Liaw, L. H., **Chiu, M. H.***, & Chou, C. C. (2014). Using facial recognition technology in the exploration of student responses to conceptual conflict phenomenon. *Chemistry Education Research and Practice*, 15, 824-834. (SSCI, Impact Factor =**1.309**)
- Lin, J. W., Yen, M. H., Liang, J. C., **Chiu, M. H.***, & Guo, C. J. (2016). Examining the factors that influence students' science learning processes and their learning outcomes: 30 years of conceptual change research, *Eurasia Journal of Mathematics, Science & Technology Education*, 2(9), 2617-2646. (SSCI, Impact Factor =**1.016**)
- Jong, J. P., **Chiu, M. H.***, & Chung, S. L. (2015). The use of modeling-based text to improve students' modeling competencies. *Science Education*, 99(5), 986-1018. (SSCI, Impact Factor =**2.921**)
- Chiang, W. W., **Chiu, M. H.***, Chung, S. L., & Liu, C. K. (2014). Survey of high school students' understanding of oxidation and reduction reaction. *Journal of Baltic Science Education*, 13(5), 596-607. (SSCI, Impact Factor =**0.444**)
- Chiu, M. H.***, Chou, C. C., Wu, W. L., & Liaw, H. (2014). The role of facial microexpression state (FMES) change in the process of conceptual conflict. *British Journal of Educational*

- Technology*, 45(3), 471–486. (SSCI, Impact Factor =1.394)
- Chen, H. J., She, J. L.*, Chou, C. C., Tsai, Y. M., & **Chiu, M. H.*** (2013). Development and application of a scoring rubric for evaluating students' experimental skills in organic chemistry: An instructional guide for teaching assistants. *Journal of Chemical Education*, 90(10), 1296-1302. (SSCI/SCI)
- Chiu, M. H.**, & Wu, W. L. (2013). A novel approach for investigating students' learning progression for the concept of phase transitions, *Education Quimica* (Special Issue on Learning Progressions in Chemistry), 24(4), 373-380.
- Chiu, M. H.** (2013). ConfChem Conference on A Virtual Colloquium to Sustain and Celebrate IYC 2011 Initiatives in Global Chemical Education – Sustainability and Globalization of Chemistry Education. *Journal of Chemical Education*, 90(11), 1564-1566. (SSCI, Impact Factor =1.001)
- Schoen, L., **Chiu, M. H.**, Steenberg, E. (2013). ConfChem Conference on A Virtual Colloquium to Sustain and Celebrate IYC 2011 Initiatives in Global Chemical Education — Young Ambassadors for Chemistry (YAC) in IYC 2011. *Journal of Chemical Education*, 90(11), 1547-1549. (SSCI, Impact Factor=1.001)
- Wang, T. H., **Chiu, M. H.***, Lin, J. W., Chou, C. C. (2013). Diagnosing students' mental models via the web-based mental models diagnosis (WMMD) system, *British Journal of Educational Technology*, 44(2), E45–E48. (SSCI, IF=2.139)
- Schoen, L., Steenberg, E., & **Chiu, M. H.**, (2012). A new type of YAC: The Young Ambassadors for Chemistry program visits Tanzania. *Chemistry International*, 34(5), 7-9.
- Bencze, J. L., Carter, L., **Chiu, M. H.**, Duit, R., Martin, S., Siry, C., Krajcik, J., and Shin, N. (2012). Globalization and science education, *COSMOS*, 8(2), 139-152.
- Chiu, M. H.** (2012). Localization, regionalization, and globalization of chemistry education, *Australian Journal of Education in Chemistry*, 72, 23-29.
- Chiu, M. H.*** and Duit, R. (2011). Editorial: Globalization: Science education from an international perspective. *Journal of Research in Science Teaching*, 48(6), 553-566. (SSCI Journal, IF=2.639) 2.9%
- Liang, J. C., Chou, C. C., & **Chiu, M. H.*** (2011). Student test performances on behavior of gas particles and mismatch of teacher predictions. *Chemistry Education Research and Practice* (SSCI), 12, 238–250. (SSCI Journal, IF=0.662)
- Anderson, J. O., **Chiu, M. H.**, & Yore, L. (2010). First cycle of PISA (2000–2006)—International perspectives on successes and challenges research and policy directions. *International Journal of Science and Mathematics Education*, 3, 373-388.
- Lin, J. W., & **Chiu, M. H.*** (2010). The mismatch between students' mental models of acids/bases and their sources and their teacher's anticipations thereof. *International Journal of Science Education*, 31(18). (SSCI Journal).

Book Chapters (in English, 2010-)

- Chiu, M. H.***, & Yu, Y. R. (2021). Globalization of chemistry education in Africa: Challenges and opportunities, In L. Mammino and Apotheker, J. (Eds), *Research in Chemistry Education* (pp.1-20). The Netherlands: Springer.

- Chiu, M. H.** & Krajcik, J. (2020). Reflections on Integrated Approaches to STEM Education: An International Perspective. In Anderson, J. & Li, Y. P. (Eds.), *Integrated Approaches to STEM Education: An International Perspective* (pp.544-559). The Netherlands: Springer.
- Lin, J. W. & Chiu, M. H. (2017). Evaluating multiple analogical representations from students' perceptions. In Gilbert, J., (Ed), *Multiple Representations in physics Education*, 71-91.
- Guo, C. J., & **Chiu, M. H.** (2016). Research projects on science education funded by the National Science Council in Taiwan From 1982 to 2012: A historical review. In Chiu, M. H. (Ed.). *Science Education Research and Practice in Taiwan: Challenges and Opportunities* (pp.43-78). The Netherlands: Springer.
- Chiu, M. H.***, Tam, H. P., & Yen, M. H. (2016). Trends in Science Education Research in Taiwan: A Content Analysis of the *Chinese Journal of Science Education* From 1993 to 2012. In Chiu, M. H. (Ed.). *Science Education Research and Practice in Taiwan: Challenges and Opportunities* (pp.11-41). The Netherlands: Springer.
- Chiu, M. H.***, Lin, J. W., & Chou, C. C. (2016). Content analysis of conceptual change research and practice in science education: From localization to globalization. In Chiu, M. H. (Ed.). *Science Education Research and Practice in Taiwan: Challenges and Opportunities* (pp. 89-131). The Netherlands: Springer.
- Guo, C. J.**, & Chiu, M. H. (2016). Opportunities and challenges for science education in Asia: Perspectives based on the Taiwan experience. In Chiu, M. H. (Ed.). *Science Education Research and Practice in Asia: Challenges and Opportunities* (in press). The Netherlands: Springer.
- Chiu, M. H.***, Lin, J. W., & Chou, C. C. (2016). Impacts of citations on conceptual change articles between 1982 And 2011: From international and regional perspectives. In Chiu, M. H. (Ed.). *Science Education Research and Practice in Asia: Challenges and Opportunities* (). The Netherlands: Springer.
- Chiu, M. H.**, & Chou, C. C. (2015). The connection between the local chemistry curriculum and chemistry terms in the global news: The glocalization perspective. J. García-Martínez & E. Serrano-Torregrosa (Eds.), *Chemistry Education: Best Practices, Opportunities and Trends* (pp. 51-72), NJ: John Wiley & Sons, Inc.
- Chiu, M. H.** (2013). International Response: A Bridging the gaps between policy and practice on equity for science education reforms: From national and international perspectives. In J. A. Bianchini, V. L. Akerson, B. A. Calabrese, L. Okhee, & A. J. Rodriguez (Eds.), *Moving the equity agenda forward*.
- Chiu, M. H.** & Chung, S. L. (2013). The use of multiple perspectives of conceptual change to investigate students' mental models of gas particles. G. Tsaparlis & H. Sevian (Eds.), *Concepts of Matters in Science Education*. The Netherlands: Springer.

- Lin, J. W. & **Chiu, M. H.** (2013). A national survey of students' conceptions and their sources of chemistry in Taiwan: Examples of chemical equilibrium and acids/bases. In M. H. Chiu, H. L. Tuan, H. K. Wu, J. W. Lin, & C. C. Chou (Eds.), *Chemical Education and Sustainability in the Global Age*. The Netherlands: Springer.
- Chen, H. J. & **Chiu, M. H.** (2013). Changes in teachers' views of cognitive apprenticeship for situated learning in developing a chemistry laboratory course. In M. H. Chiu, H. L. Tuan, H. K. Wu, J. W. Lin, & C. C. Chou (Eds.), *Chemical Education and Sustainability in the Global Age*. The Netherlands: Springer.
- Chiu, M. H.** & Chung, S. L. (2013). Why the particulate nature of matter is so difficult to learn: A universal or a local problem? G. Tsapalis & H. Sevin (Eds.), *Concepts of Matters in Science Education*. The Netherlands: Springer.
- Chiu, M. H.** & Wang, N. (2011). Marie Curie and Science Education. In M. H. Chiu, Penny Gilmer, & David Treagust (Eds.), *Celebrating the 100th Anniversary of Madam Maria Sklodowska Curie's Nobel Prize in Chemistry* (pp. 9-39). Sense Publisher.
- Chiu, M. H.** (2011). Bridging the gaps between policy and practice on equity for science education reforms. To be appeared in J. A. Bianchini, V. L. Akerson, A. Calabrese Barton, O. Lee, and A. J. Rodriguez (Eds.), *Moving the Equity Agenda Forward: Equity Research, Practice, and Policy in Science Education*. Springer Publisher.
- Chiu, M. H.** & Chen, H. J. (2011). Alignment of students' learning outcomes with assessment, curriculum standards, and scientific literacy. 5th IPN-York Symposium book on *Learning Outcomes in Science Education*, Waxmann: Münster/ New York/ München/ Berlin.
- Chiu, M. H.** (2010). Chemistry education in Taiwan. In Björn Risch (Ed.). *Chemistry in the world*. Waxmann. Münster/ New York/ München/ Berlin.

Conferences: More than 100 conference presentations and more than 30 invited plenary and keynote speeches.

Books (2010-)

- Chiu, M. H.** (2016, Ed., Chienese version). *Science education research and practice in Taiwan: Challenges and opportunities*. Higher Education.
- Chiu, M. H.** (2016, Ed.). *Science education research and practice in Taiwan: Challenges and opportunities*. The Netherlands: Springer.
- Chiu, M. H.** (2016, Ed.). *Science education research and practice in Asia: Challenges and opportunities*. The Netherlands: Springer.
- Chiu, M. H.,** Tuan, H. L., Wu, H. K., Lin, J. W., & Chou, C. C. (2013, Eds.), *Chemical education and sustainability in the global age*. The Netherlands: Springer.

Chiu, M. H., Gilmer, P. G., & Treagust, D. F. (2011, Eds.). *Celebrating the 100th anniversary of Madame Marie Sklodowska Curie's Nobel Prize in Chemistry*. The Netherlands: Sense Publishers.

Patents

1. The hierarchical assessment system and method via concept map network design (100HFA030096 in Taiwan)
2. The design of hierarchical assessment items system and method (100HFA030097 in Taiwan)
3. (Assessment system and method of the use of facial expression recognition technique (101HFA030116 in Taiwan)