

Two Young Observers at the WCC in The Hague Share Their Reflections

by Mattias Wei Ren Kon, Jovern Teo, Fun Man Fung, and Marietjie Potgieter

The IUPAC World Chemistry Congress (WCC) in The Hague attracted delegates from all locations and all ages to share exciting research, new insights and recent developments, and to build new relationships. Among them were two students from a STEM specialisation high school in Singapore who came to present a poster on their research project, Mattias Kon and Jovern Teo. They share their reflections on the experience in this article, conversing with Marietjie Potgieter, chair of the Committee on Chemistry Education.

Marietjie: Most of the members of the Committee on Chemistry Education have regular encounters with younger students, but still your attendance at the IUPAC General Assembly might have surprised a few. Let us start with introduction.

Mattias: My team and I are from Singapore, an island country and city-state in Southeast Asia. We completed our tertiary education diploma at the NUS High School affiliated with NUS (National University of Singapore) which specialises in mathematics and the sciences. Most of us have deep-rooted ties with maths and science stemming from a young age, and various primary school competitions have converged us towards our school where we could thrive in an environment alongside like-minded individuals.

Last year, Jovern Teo, Panshul Sharma, and I collaborated with our research mentors, Fun Man Fung and Yulin Lam in their Organic Chemistry education research as researchers under the SCIENTIA programme. We were brought together by our common love for the subject matter, a desire to contribute to chemistry education to improve the learning experience for our juniors, and of course a drive to step outside of our comfort zone and attempt formal pedagogy research.

SCIENTIA is a programme encouraging the mentorship of NUS High School students in science research by both external researchers and internal teacher mentors. NUS High School believes in the authentic learning experience such innovation provides, and through SCIENTIA we were also able to receive the support of Yun Ling Teh and Sher-Yi Chiam as our teacher mentors.

We were all introduced to Chemistry in Grade 7 through the foundational concepts of periodicity, the elements, and states of matter. Two years later, I

concluded that Chemistry was my favourite science and it was what I hoped to pursue further over the upcoming years. To do just that, I was accepted into my school's Chemistry Olympiad training team in Grade 8. Since then, I remained an engaged learner till Grade 12 when all three of us took part in the final selections to represent Singapore in the International Chemistry Olympiad [1,2].

Our experience and exposure to advanced content enabled me to have great fun when learning Chemistry throughout high school. However, despite my pleasant memories doing Chemistry and the welcoming environment of IUPAC, a shadowing experience in healthcare convinced me that perhaps I would prefer to engage and care for others for the rest of my life. Thus, I aim to pursue Medicine at NUS.

Jovern: In our STEM specialised school, I was able to delve into different Olympiads—namely Biology, Chemistry, and Physics - and decided to focus on the Chemistry Olympiad from Grade 9 onward. As the central science, Chemistry interfaces with both Biology (biochemistry, protein folding, chromatography) and Physics (quantum mechanics, material science); and thus, is the most interesting to me. Through the pandemic years, I embarked on previous dry lab research projects such as pandemic modelling and motion tracking controls to seek solutions to life-changing circumstances. We believe a multidisciplinary exposure to research with statistics, programming, and computational science came in useful when our team of three aimed to better analyse and present our findings in this Organic Chemistry pedagogy project which aspires to gamify the learning process.

I feel that education and knowledge empowers, and this applies even to healthcare and well-being. To enhance health literacy, I volunteer actively at community outreach events and coach at-risk residents living with chronic conditions as a health peer for preventive healthcare. Currently, I am challenging myself in a range of medical and healthcare environments like wet lab microbiology research and various clinical patient settings to explore if a medical career rooted in clinical research can be right for me.

From 2024, all our team members have to enlist in the Singaporean military before we embark on our further studies, but we are also committed to following up on our Organic Chemistry pedagogy research while being actively involved in Chemistry Olympiad training and science research mentorship for juniors as time allows.



Mattias Kon (middle row, far right) and the Committee for Chemistry Education at the IUPAC General Assembly 2023.

Marietjie: How did it come about that you submitted a poster abstract for the WCC and what did you expect to gain from it?

Mattias: We came together to work on the development and trial of a digital, multiplayer Organic Chemistry game, ChemPOV [3]. The three of us (Jovern, Panshul and myself) feel passionately about improving the learning experiences of our peers and juniors, and believed in ChemPOV's ability to re-define this. Our mentor, Dr. Fung, encouraged us to submit an abstract to IUPAC WCC 2023. Having been to the American Chemical Society (ACS) Spring Meeting earlier this year, we were hoping this conference would broaden our horizons further. Jovern and I wanted to get to know more chemists from around the world and forge meaningful friendships. Of course, we also wanted to spread the word of ChemPOV to others, obtain valuable feedback from experienced industry experts, and rally support from those who believed in our cause.

I arrived in time for the General Assembly and initially popped by the Committee for Chemistry Education (CCE) to send regards and deliver gifts on behalf of Dr. Fung who couldn't attend the WCC due to academic obligations, but the warm and welcoming environment created by you [Prof. Marietjie Potgieter, CCE Chair], as well as the other key members of the CCE encouraged me to stay on further throughout the weekend. I was even kindly invited to the CCE dinner in which a fellow observer, Aaryan Singh,¹ and I had conversations with numerous CCE members and learned more

about their fields of Chemistry. To say it was meaningful and enriching would be an understatement.

Jovern: Firstly, my motivation for attending the WCC with Mattias was propelled by my desire to appreciate the resources available to professional scientists and observe how they network, collaborate and create. Secondly, I wanted to understand how scientists approach their research goals. Having participated in national and regional science fairs since Grade 8, I feel that student science fairs in general tend to distinguish winners from non-winners, much unlike the nature of professional research. I wished to witness how scientists glean insights from challenges, and proceed with or pivot their research direction in the face of obstacles. Thus, when Dr. Fung shared about IUPAC, I was eager to take part so that I could grow from the experience.

Marietjie: How did you manage to come to The Hague to attend the General Assembly and the WCC (this was surely a costly exercise) and what are your impressions of the experience?

Mattias: My mother was always willing to support me with regards to my interests and financed our trip to The Hague. The IUPAC 2023 planning team did such a splendid job in securing sound partnerships with key hotels that participants like myself were readily able to book good-quality ones at competitive rates.

The General Assembly introduced me to a series of works undertaken by the CCE, and my takeaways were vast. I was introduced to the various branches

¹ See Up for Discussion, p. 36

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of the CCE dedicated to honouring educators, developing new project ideas, and future event planning (i.e. conferences), just to name a few. The one that resonated with me the most was the CCE-supported Community Service Projects. As an avid community service leader and volunteer myself, I felt extremely strongly towards the lovely work pioneered by both Prof. Supawan Tantayanon of Thailand and Prof. Zuriati Zakaria of Malaysia, Small-Scale Chemistry in the context of underprivileged children in rural parts of Asia [4]. I believe that as a Chemistry student, imparting the beauty of Chemistry to others who are less able to access it is among the most fulfilling tasks one can undertake. I would hope to be able to one day support this initiative, and it would mean a lot to me.

The WCC was extremely professional, extremely international, and unexpectedly, extremely comforting. Everyone around the building appeared so enthusiastic to approach one another and exhibit our shared love for Chemistry. Although everyone was new to us, the IUPAC community is so inherently supportive that many of whom we just encountered were willing to drop by our Poster Presentation and offer us feedback. One of them was Dr. Yvonne Choo from Xiamen University Malaysia, a fellow member of the International Young Chemists' Network (IYCN), who I first met on Day 1 of the General Assembly [5,6].

This was surprising to me because I feel that Singaporean culture does not actively encourage stranger-stranger interactions, and our society is considerably more conservative regarding pleasantries and informal communications. I felt at home striding into the World Forum every morning, and the people at IUPAC are truly the ones who have made my experience such a memorable one.

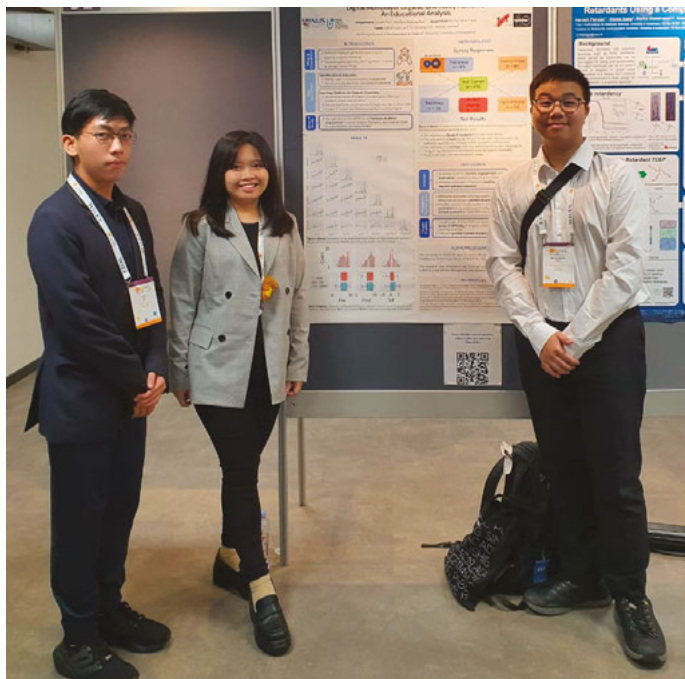
Jovern: I convinced my parents to visit their close friends who live in The Hague. They were most kind to put us up at their home which was serendipitously just minutes away from the congress venue. Like Mattias, my parents are greatly supportive of my interests. Furthermore, the win-win proposition that 'child attends conference while parent does sightseeing with friends' sweetened the deal. I took full advantage of the excellent cycling infrastructure and amazing summer weather by cycling or scooting across the Scheveningse Bosjes park daily. As the WCC was equipped with world-class amenities, I was able to leave my scooter at the luggage hold area for the day. I really cherished my time there experiencing Chemistry as a professional while commuting like a local resident.

Overall, the congress was fun. It was in the

Goldilocks Zone in terms of set-up—not too big, not too small, but just right—so it was convenient transiting between different sessions. Exploring the enjoyable talks in computational science, education, sustainability efforts, and biology enabled me to develop a more thorough grasp of emerging innovations and recognize chemistry's foundational importance to practical solutions in the real world.

For example, Prof. Grzybowski's work on AI-generated synthetic pathways for complex natural products accelerates drug discovery at an unforeseen pace [7]. It was further adapted to upcycle chemical waste with positive knock-on impacts to green initiatives. To me, this was a fascinating testament to the potency of interdisciplinary synergies. There was also an openness about admitting to mistakes in hypotheses or project processes. I feel this best highlights the true spirit of scientific inquiry, where unanticipated results are in fact the truly desirable discoveries as they teach you about something you don't already know.

I found the plenary talks accessible and informative, helping me gauge my interest in evolving trends across various fields, such as polymer design, catalysis, and more. The youth program presented valuable perspectives into the diverse career paths stemming from a scientific education. It explored seldom-discussed mental health challenges and even showcased diverse opportunities accommodating various capacities and



Jovern Teo and Mattias Kon with Dr Yvonne Choo of Xiamen University Malaysia at our poster.

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age profiles within research groups all over the world. Finally, I had the incredible opportunity to connect with new individuals and explore exciting locations. I paid the Shell Energy Transition Campus in Amsterdam a visit as part of the IUPAC WCC program, and after the concluding day of the congress, I enjoyed Scheveningen Beach alongside newfound friends from the International Younger Chemists Network (IYCN).

Final Words

Mattias and Jovern: The IUPAC WCC was the first scientific conference we participated in on our own. We experienced both the in-depth theoretical side of Chemistry and were able to meet many new people. We want to thank our school, our research mentors, and our parents for their support and the opportunity to go overseas. We also want to thank IUPAC for the wonderful conference and Chemistry International for this opportunity to share our story. 🏠

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Jovern Teo (third row, middle) with fellow IUPAC participants at the Energy Transition Campus Amsterdam (pict by Nine Gerrits, KNCV junior project manager).