

## COOPERATION BETWEEN CZECH AND CHINESE ELECTROANALYTICAL CHEMISTS

*This article is dedicated to the 150<sup>th</sup> anniversary of the journal Chemické listy.*

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This article briefly describes the long history of cooperation between Czech and Chinese electroanalytical chemists from the perspective of the Faculty of Science, Charles University in Prague, as reflected at the 20<sup>th</sup> International Symposium on Electroanalytical Chemistry in Changchun. This cooperation began after Jaroslav Heyrovský's first paper on polarography had been published (in Czech language) in this Journal, which is one of the oldest continuously existing chemistry journals on the European continent. Trends in modern electroanalytical chemistry, which are logically reflected in this cooperation, are also discussed, and a brief description is provided of the State Key Laboratory of Electroanalytical Chemistry (SKLEAC) at the world-renowned CIAC (Changchun Institute of Applied Chemistry), in Changchun, China, which is a long-standing partner of ULEEC (UNESCO Laboratory of Environmental Electrochemistry) at the Faculty of Science, Charles University in Prague.

Keywords: polarography, electrochemistry, combination of electrochemistry and mass spectrometry, State Key Laboratory of Electroanalytical Chemistry in Changchun, UNESCO Laboratory of Environmental Electrochemistry in Prague

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### 1. Introduction

The history of cooperation between Czech and Chinese electroanalytical chemists began after Jaroslav Heyrovský's first publication on polarography<sup>1</sup> (in Czech language and in our journal). Although Masuro Shikata, who made a significant contribution to the construction of the photo-recording polarograph<sup>2</sup>, was of Japanese origin, he became director of the prestigious Changchun Institute of Applied Chemistry (CIAC) in Changchun, Manchuria<sup>3</sup>, and remained so even after Manchuria was re-incorporated to China and the People's Republic of China was established in 1949. The fact that one of Jaroslav Heyrovský's last doctoral students (PhD students in today's terminology) was Prof. Erkang Wang (see Fig. 1A), one of the most prominent figures not only in Chinese but also in global electroanalytical chemistry (see Fig. 1B) and long-time director of SKLEAC (State Key Laboratory of Electroanalytical Chemistry, ref.<sup>4</sup>), an important part of CIAC (see Fig. 1C) in Changchun.

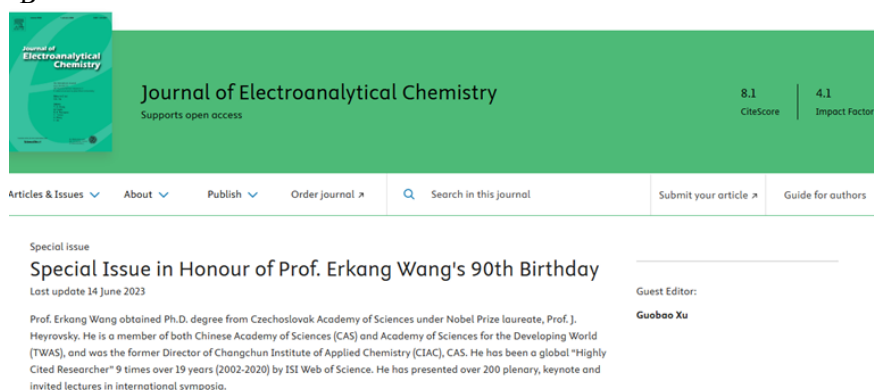
The second significant moment was the establishment of the UNESCO Laboratory of Environmental Electrochemistry<sup>5</sup> (ULEEC) by the decision of the 22<sup>nd</sup> UNESCO General Conference in Paris in 1983, which is inextricably linked with the names of Prof. Kalvoda and Prof. Zýka. Since 1990, ULEEC has been operating as a joint research centre of the Jaroslav Heyrovský Institute of Physical Chemistry of the Czech Academy of Sciences (ÚFCH JH) and the Department of Analytical Chemistry of the Faculty of Science, Charles University.

SKLEAC, as a leading and internationally recognised centre in the field of electroanalytical chemistry, has been organising the prestigious International Symposium on Electroanalytical Chemistry (ISEAC) for 40 years (ref.<sup>6</sup>), which exemplarily reflects modern trends in electroanalytical chemistry and catalyses international cooperation. The very good international standing of Czech electroanalytical chemistry is reflected in the fact that in practically every year of ISEAC, a representative of the Czech electroanalytical school has been a member of the International Advisory Board (e.g., Prof. Kalvoda, Prof. Samec, Prof. Štulík, and, in recent years, the author of this article), as well as a significant number of invited lectures given by representatives of Czech electroanalytical chemistry, who often chaired individual sections.

A



B



C



Fig. 1. (A) Prof. Erkang Wang, (B) cover page of a special issue of the Journal of Electroanalytical Chemistry dedicated to Prof. Erkang Wang's 90<sup>th</sup> birthday, (C) CIAC campus in Changchun, China

The 20<sup>th</sup> jubilee ISEAC focused on the following important areas of electroanalytical chemistry:

- New methods and equipment for electrochemical analysis.
- Nano- and supramolecular electrochemistry.
- Bioelectrochemistry and electroanalytical chemistry.
- Liquid chromatography and capillary electrophoresis and electrochemistry.
- Electrochemiluminescence and micro-total analytical systems.
- Combination of electrochemistry with other analytical methods.

Invited lectures by leading experts (mostly well known to Czech electroanalytical chemists) in these fields (e.g., Christian Amatore, Shao Dong, Serge Cosnier, Neso Sojic, Arkady Karyakin, Itamar Willner, Hubert Girault, and Francesco Paolucci) were a truly exceptional experience for the author of these lines and confirmation of the exclusivity of ISEAC and its 20<sup>th</sup> anniversary. Equally exceptional was the presentation by Simona Baluchová, Ph.D., from the Department of Analytical Chemistry, Faculty of Science, Charles University in

Prague (Additive Manufacturing Approaches for Advanced Boron-Doped Diamond Electrodes). Both this presentation and the award for the best poster in the "Advanced Sensors and Energy Materials" section (see Fig. 2) confirm that Simona Baluchová truly deserves the title "rising star in analytical chemistry" used in our magazine in connection with the upcoming generation of analytical chemists and that the 2019 Metrohm Award for the best publication by a young chemist in the field of electroanalytical chemistry for her work on the electroanalysis of tumour biomarkers<sup>7</sup> is in the right hands. Simona Baluchová also confirmed her exceptional qualities by participating in the 3<sup>rd</sup> Chemistry Europe Early Career Researchers Meeting in Weinheim<sup>8</sup>.

Given Simona Baluchová's qualities described above, it will come as no surprise that she was selected by the organising committee of the 20<sup>th</sup> ISEAC from a large number of applicants to participate in the prestigious two-week International Training School on Hyphenated Techniques for Electrochemical Interface Study organised by Prof. Guobao Xu from SKLEAC (see Fig. 3) and fully funded by the inviting party.



Fig. 2. (A) Award for the best poster in the Advanced Sensors and Materials section presented to Simona Baluchová, (B) Prof. Fred Lisdat presenting the award to Simona Baluchová, (C) heading of the award-winning poster

## 2. Prospects for further Chinese-Czech cooperation

ULEEC in Prague naturally focuses its scientific and research work in line with modern trends in the field of electroanalytical chemistry. Special attention is paid to the use of these methods in flow systems, as discussed in detail in the technical report of the IUPAC project focused on the use of flow analytical systems with electrochemical detection for monitoring of biologically active substances<sup>9</sup>. Following on from this project, we are now

preparing (in collaboration with our Chinese colleagues, namely Prof. Guobao Xu) another IUPAC project within Division V (ref.<sup>10</sup>) focused on monitoring of carcinogenic organic compounds in various environmental matrices using modern (not only) electroanalytical methods with an emphasis on their sustainability and compatibility with green analytical chemistry. We expect that this topic will be discussed at the prestigious 20<sup>th</sup> ESEAC conference<sup>11,12</sup> (European Society of Electroanalytical Chemistry) in Lisbon, Portugal, on 7–11 June 2026. (The author of this article, as a representative of ULEEC, and Prof. Guobao



Fig. 3. Photograph of participants at the prestigious International School of Hyphenation Techniques in Changchun. Simona Baluchová on the far left, Prof. Guobao Xu in the centre

Xu, as a representative of SKLEAC, are members of the scientific committee of this conference, and Simona Baluchová has an invited lecture there.) An attractive option is the offer of financially very interesting postdoctoral stays at SKLEAC for our younger colleagues. Other areas of ULEEC's scientific and research work, such as the combination of enzymatic and electrochemical methods using separate enzymatic and electrochemical reactors<sup>13</sup>, the combination of electrochemical methods with mass spectrometry<sup>14</sup>, or new approaches to 2D/3D printing of new electrode materials<sup>15</sup>, may be a common denominator for further cooperation between our laboratories. The same applies to the use of the very attractive method of batch injection analysis<sup>16</sup> or the issue of using boron-doped diamond electrodes for *in vitro* monitoring of neurotransmitters in complex matrices of neuronal culture environments<sup>17</sup> represented by Prof. Zima, the new Rector of Charles University, as one of the leading members of our ULEEC.

### 3. Conclusion

If in 2025 we celebrated 100 years of existence of our Department of Analytical Chemistry at the Faculty of Science, Charles University in Prague, and this year we are celebrating 150 years of existence of our journal *Chemické listy*, then it is appropriate to look into the

future. The author of this article is convinced that, despite the fascinating possibilities offered by modern separation and spectrometric methods, the well-known advantages of electroanalytical methods (low acquisition and operating costs, considerable sensitivity and selectivity, compatibility with green and white analytical chemistry, easy portability allowing their use at the place of analysis or at the patient's bedside, and, in particular, high user-friendliness) are so attractive from the point of view of analytical practice and scientific research that even on the 175<sup>th</sup> anniversary of *Chemické listy* and the 125<sup>th</sup> anniversary of the Department of Analytical Chemistry at the Faculty of Science, Charles University, Simona Baluchová, as a representative of the next generation of electroanalytical chemists, will be able to write a similar article celebrating and evaluating further cooperation between Czech and Chinese scientists in the field of modern electroanalytical methods. In the meantime, we look forward to the 21<sup>st</sup> ISEAC 2027 (ref.<sup>18</sup>) and to meeting Chinese electroanalytical chemists at the World Chemical Congress of the International Union of Pure and Applied Chemistry (IUPAC) in Prague in 2029, about which our readers will be informed in proper time on the website of the Division of Analytical Chemistry of the Czech Chemical Society (ref.<sup>19</sup>), Division V (Analytical Chemistry) of IUPAC (ref.<sup>20</sup>), and the Department of Analytical Chemistry of the Faculty of Science, Charles University (ref.<sup>21</sup>).

## REFERENCES

1. Heyrovský J.: Chem. Listy 16, 256 (1922).
2. Heyrovský J., Shikata M.: Recl. Trav. Chim. Pays-Bas 44, 496 (1925).
3. <http://english.ciac.cas.cn/au/bi/>, downloaded on 20 February 2026.
4. <https://www.nature.com/nature-index/institution-outputs/china/state-key-laboratory-of-electroanalytical-chemistry-skleac-ciac-cas/547fedd6140ba0226bb0ffe7>, downloaded on 20 February 2026.
5. Štulík K., Kalvoda R.: *Electrochemistry for Environmental Protection. Technical Report No. 25*. UNESCO Venice Office, Regional Office for Science and Technology for Europe (ROSTE), Venice 1996.
6. [http://english.ciac.cas.cn/ns/ue/202407/t20240717\\_673059.html](http://english.ciac.cas.cn/ns/ue/202407/t20240717_673059.html), downloaded on 20 February 2026.
7. Baluchová S., Barek J., Tomé L. I. N., Brett C. M. A., Schwarzová-Pecková K.: J. Electroanal. Chem. 821, 22 (2018).
8. Baluchová S.: Chem. Listy 118, 564 (2024).
9. Labuda J., Banks C. E., Barek J. and 8 other authors: Pure Appl. Chem., in press. <https://doi.org/10.1515/pac-2025-0514>.
10. [https://iupac.org/wp-content/uploads/2025/06/Div5\\_Craston\\_20250424.pdf](https://iupac.org/wp-content/uploads/2025/06/Div5_Craston_20250424.pdf), downloaded on 20 February 2026.
11. <https://iupac.org/event/20th-international-conference-on-electroanalysis-eseac-2026/>, downloaded on 20 February 2026.
12. <https://eseac2026.events.chemistry.pt>, downloaded on 20 February 2026.
13. Tvorynska S., Josypcuk B.: Anal. Chim. Acta 1384, 344923 (2026).
14. Ivakh S., Koall M., Barek J., Matysik F.-M.: Talanta 288, 127729 (2025).
15. Baluchová S., Buijnsters J. G.: Adv. Mater. Technol. 10, e01111 (2025).
16. Svitková V., Labuda J., Vyskočil V.: Electroanalysis 31, 2001 (2019).
17. Lytvynenko A., Baluchová S., Zima J., Krůšek J., Schwarzová-Pecková K.: Bioelectrochemistry 158, 108713 (2024).
18. [http://english.ciac.cas.cn/ns/es/202509/t20250905\\_1054106.html](http://english.ciac.cas.cn/ns/es/202509/t20250905_1054106.html), downloaded on 20 February 2026.
19. <https://osanal.csch.cz>, downloaded on 20 February 2026.
20. <https://iupac.org/body/500/>, downloaded on 20 February 2026.
21. <https://natur.cuni.cz/chemie/katedry-a-pracoviste/katedra-analyticke-chemie>, downloaded on 20 February 2026.

