

# Pitchnaree Kraikaew

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Former postdoctoral fellow at NANOTEC, NSTDA (Thailand). Ph.D. in chemistry at the University of Geneva (Switzerland). I developed a new electronic readout of electrochemical sensors for high-sensitive measurements of ionic species in environmental and clinical samples, which was coupled to an automated flow system. My main background is electrochemistry of ion-selective electrodes, flow injection analysis, analytical instruments, and basic electronics. I am experienced in the computational simulation of ion diffusion, membrane potential and Faradaic current, and the development of portable potentiostats.

## EDUCATIONS

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**University of Geneva**, Geneva, Switzerland

Ph.D. in Chemistry 10/2017-5/2022

**Mahidol University**, Bangkok, Thailand

M. Sc. in Chemistry 8/2013-4/2017

**Prince of Songkla University**, Songkhla, Thailand

B. Sc. in Chemistry 6/2009-3/2013

## RESEARCH PROJECTS

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**Postdoctoral fellow**, NANOTEC, NSTDA (Thailand)

7/2022 - 6/2023

Supervisor: Dr. Paisan Khanchaitit

- Design and development of a low-cost and portable electrochemical sensor on a printed circuit board (PCB) for monitoring calcium levels in seawater.

**Ph.D. program** in Inorganic and Analytical Chemistry, University of Geneva

10/2017-5/2022

Supervisor: Professor Eric Bakker

- Development of a portable instrument for capacitive readout using an ion-selective electrode (ISE) and study of current polarization limitation.
- Development of an ultrasensitive potentiometric pH probe for small pH change in seawater using an ISE in series with an electronic capacitor.
- Application of Kirchhoff's law to develop a solid-contact ISE-based potentiometric probe containing two capacitors for rapid pH measurement.
- Development of a new electronic system for automated capacitive readout of ISEs for the high-precision measurement of Na<sup>+</sup> in serum.
- Development of a portable potentiostat and computational simulation of membrane transport and resulting potentials.
- Development of self-powered potentiometric sensor transduction to a capacitive electronic component for later readout.
- Development of electrochemically controlled fluorescence detection with localized ion transfer of lipophilic solvatochromic dyes.

**M. Sc. in Analytical Chemistry**, Mahidol University

9/2013-4/2017

Supervisor: Associate Professor Duangjai Nacapricha

- Development of simultaneous determination of ethanol and total sulfite in white wine using on-line cone reservoirs membraneless gas-liquid separation flow system.

**Abroad Internship** in Physical Chemistry, Oxford University

1/2016-6/2016

Supervisor: Professor Richard G. Compton

- Research on the influence of nanoparticle surface coverage on Pt electrode on the speciation of electrochemically generated chlorine.

- Research on the substrate specificity for pyranose 2-Oxidase based enzyme kinetic.

- Extraction of chemical constituents from the Twigs of *Knema.globularia* (Lam.) Warb.

## **PUBLICATIONS/ CONFERENCE PROCEEDINGS**

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1. P. Kraikaew, Y. Soda, R. Nussbaum, S. Jeanneret, E. Bakker. "Portable Instrument and Current Polarization Limitations of High Sensitivity Constant-Potential Capacitive Readout with Polymeric Ion-Selective Membranes", *Sensors and Actuators B: Chemical*, **2023**, 379, 133220. (IF 9.221, Tier 1, Q1)
2. P. Kraikaew, S.K. Sailapu, E. Bakker. "Electronic control of constant potential capacitive readout of ion-selective electrodes for high precision sensing", *Sensors and Actuators B: Chemical*, **2021**, 344, 130282. (IF 9.221, Tier 1, Q1)
3. P. Kraikaew, S. Jeanneret, Y. Soda, T. Cherubini, E. Bakker. "Ultrasensitive Seawater pH Measurement by Capacitive Readout of Potentiometric Sensors", *ACS Sensors*, **2020**, 5 (3), 650-654. (IF 9.618, Tier 1, Q1)
4. P. Kraikaew, S.K. Sailapu, E. Bakker. "Rapid constant potential capacitive measurements with solid-contact ion-selective electrodes coupled to electronic capacitor", *Analytical Chemistry*, **2020**, 92 (20), 14174-14180. (IF 8.008, Tier 1, Q1)
5. S.K. Sailapu, P. Kraikaew, N. Sabaté, E. Bakker. "Self-Powered Potentiometric Sensor Transduction to a Capacitive Electronic Component for Later Readout", *ACS Sensors*, **2020**, 5 (9), 2909-2914. (IF 9.618, Tier 1, Q1)
6. P. Kraikaew, E. Bakker. "Ultra-Sensitive Measurement of Ocean pH", *Chimia*, **2020**, 74 (12), 1021-1021. (IF 1.509, Q3)
7. P. Kraikaew, T. Pluangklang, N. Ratanawimarnwong, K. Uraisin, P. Wilairat, T. Mantim, D. Nacapricha "Simultaneous determination of ethanol and total sulfite in white wine using on-line cone reservoirs membraneless gas-liquid separation flow system", *Microchemical Journal*, **2019**, 149, 104007. (IF 5.304, Q1)
8. P. Kraikaew, E.E.L. Tanner, S.V. Sokolov, C. Batchelor-McAuley, J. Holter, N.P. Young, R. Compton. "Nanoparticle surface coverage controls the speciation of electrochemically generated chlorine", *ChemElectroChem*, **2016**, 3 (11), 1794-1798. (IF 4.782, Q1)
9. P. Kraikaew, S. Supuntee, P. Prapunpoj. "Proteomic analysis of Major depressive disorder plasma during Fluoxetine treatment" *Pure and Applied Chemistry International Conference*, **2013** (Proceeding).
10. P. Kraikaew, T. Mantim, T. Wongpakdee, K. Uraisin, D. Nacapricha. "Fabrication of Paired Emitter-detector Diode as Flow-through Optical Detector for Flow Analysis", *4<sup>th</sup> Suan Sunandha Academic National Conference*, **2016** (National Proceeding).

## **CONFERENCES / PRESENTATIONS (Selected)**

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1. P. Kraikaew, S.K. Sailapu, S. Jeanneret, E. Bakker. "Capacitive Readout of Ion-Selective Electrode by Electronic Control for High Precision Measurements", *CHanalysis*, Beatenberg (Switzerland), April 19-20, **2022** (oral presentation).
2. P. Kraikaew, S.K. Sailapu, E. Bakker. "Capacitive Readout of Ion-Selective Electrode by Electronic Control for High Precision Measurement", *Presentation for Mettler Toledo company*, Switzerland, November 3, **2021** (oral presentation).
3. P. Kraikaew, S.K. Sailapu, E. Bakker. "Capacitive Readout of Ion-Selective Electrode by Electronic Control for High Precision Measurement", *SCS Fall Meeting*, Switzerland, September 10, **2021** (oral presentation).
4. P. Kraikaew, E. Bakker. "Ultra-sensitive pH measurements with a coulometric principle", *Geneva Chemistry & Biochemistry Days*, Geneva (Switzerland), January 14-15, **2021** (oral presentation).
5. P. Kraikaew, E. Bakker. "In-Line Capacitive Readout for pH analysis of Ion-Selective Electrodes", *CHanalysis*, Beatenberg (Switzerland), April 11-12, **2019** (poster presentation).
6. P. Kraikaew, E. Bakker. "In-Line Capacitive Readout for pH analysis of Ion-Selective Electrodes", *Matrafured*, Visegrad (Hungary), June 16-21, **2019** (poster presentation).
7. P. Kraikaew, L. Wang, E. Bakker. "Electrochemical controlled fluorescence detection with localized ion

8. transfer of lipophilic solvatochromic dyes”, *CHanalysis*, Beatenberg (Switzerland), April 12-13, **2018** (poster presentation).
9. P. Kraikaew, E. Bakker. “Capacitive Readout of Potentiometric Probes”, *International Conference on Ion Analysis*, Germany (Berlin), September 9-12, **2018** (poster presentation).
10. P. Kraikaew, T. Mantim, K. Uraisin, D. Nacapricha. “Membraneless vaporization for simultaneous determination of ethanol and sulfite by flow analysis”, *Flow Analysis XIII conference*, Prague (Czech Republic), July 5-10, **2015** (poster presentation).

## SKILLS

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Research	: Operating analytical instruments including potentiometry, flow analysis, AAS, graphite furnace, GC-MS, EIS, UV-VIS and fluorescence spectrometer, chromatography, SEM, FT-IR, and confocal microscopy. : Fabricating and designing flow system for auto-measurement of fluid samples. : Cell culture, protein electrophoresis, and study enzyme kinetic. : Writing publications submitted to international journals. : Designing basic electronic circuits and portable devices. : Individually carrying out research.
Computer	: Mathematical simulations of ion diffusion, membrane potential, and Faradaic current using Mathematica software. : Basic knowledge of Python, Matlab, and Chemdraw.
Language	: Thai (native), English

## AWARDS / SCHOLARSHIP

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- Ph.D. with First Class Honors 5/2022
- Development and Promotion of Science and Technology Talents Project (DPST) scholarship, Thai government. 5/2009-5/2022
- 2<sup>nd</sup> Prize oral presentation: “Ultra-sensitive pH measurements with a coulometric principle”, Geneva Chemistry & Biochemistry Days 2021, Switzerland. 1/2021
- The honorary award from the faculty of Science, Mahidol University, Thailand. 10/2015
- The best poster award: “Membraneless Vaporization for Simultaneous Determination of Ethanol and Sulfite by Flow Analysis”, Flow Analysis XIII conference, Czech Republic. 7/2015

## JOBS / ACTIVITIES

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- Teaching assistant of practical lab course at the University of Geneva 8/2017-5/2022
- Vice-president of Accounting of the Association of Thai Students in Switzerland 1/2018-1/2019
- Academic staff of the 49<sup>th</sup> International Chemistry Olympiad in Thailand 1/2017
- Teaching assistant in the instrumental analysis laboratory at Mahidol University 1/2015-5/2015
- Attendant of the 4<sup>th</sup> ASEAN Synchrotron Science Camp, Suranaree University of Technology 11/2015
- Joining graduate sports event at Mahidol University (volleyball player) 10/2015
- Contestant of mini-invention contest, 8<sup>th</sup> Science and Technology for Youths 3/2013
- Teaching assistant and accounting manager of the Science Academic Club 5/2010-4/2011
- Organizer of the 21<sup>st</sup> and 22<sup>nd</sup> Junior Science Camp at Prince of Songkla University 6/2010, 6/2011
- Mathematic tutor at Saengthong Vitthaya School. 6/2010-9/2010

## REFERENCES

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**Professor Eric Bakker** (Ph.D. Thesis advisor)  
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