

20 years of automated electrophysiology – according to Nanion!

Dear Colleagues and Friends,

we would like to take the beginning of 2022 as an opportunity to review some highlights of the past year with you – and look back even a little further, as Nanion celebrates its 20th anniversary this January! We are indeed proud and more than thankful for what we have achieved and would like to share a brief reflection and memories together with you.

Twenty years ago, we published what I would consider to be my most important scientific work: the development and successful implementation of the planar patch clamp approach. Our Biophysical Journal paper in 2002 [“Whole Cell Patch Clamp Recording Performed on a Planar Glass Chip”](#) was the first publication ever demonstrating patch-clamp-on-a-chip with mammalian cells. The relevance of which was kindly highlighted by an accompanying [New&Notable](#) feature article written by Fred Sigworth et al. from Yale University. This work was not only the most important of my scientific achievements, but also the basis for starting Nanion Technologies in the same year – in fact it still is the backbone of our business today.



In 2003, we were a small group of 4 scientists in a small start-up at the LMU in Munich. Over the years, we have moved premises 3 times, each place bigger than the last, we have grown to a company of over 100 employees worldwide, and we have opened daughter companies in USA, Japan, China and Denmark. We have introduced instruments for automated patch clamp, bilayer recordings, contractility and field potential measurements, and transporters.

The patch-clamp-on-a-chip enabled automation of the patch clamp process, as well as allowing experiments to be performed in parallel. The technique has come a long way since those early days as we now work with 384 well-plate patch chips and fully automated robotic systems, thereby ensuring that ion channel analysis can be considered a truly high throughput screening technique. Over the past two decades, we have continually developed, refined and continued to scale-up the chip technology and instrumentation to enable automated electrophysiology to be combined with high fidelity AND high throughput.

It feels like a lifetime ago when we started Nanion 20 years ago, while at the same time, it almost feels like yesterday. We have certainly stayed true to our passion for continuous improvement and constant innovation. We are still absolutely committed to providing the best possible support for our customers and users. And most importantly, we are tremendously thankful for your continued interest in Nanion, our instruments and in working with us. We feel truly honored to have so many outstanding collaborations, partnerships, and friendships with our users over the last 20-year period.

Despite all the uncertainties related to the ongoing pandemic, Nanion's business has been thriving in 2021. We introduced a new SyncroPatch 384 generation and a new consumable type as well as the new Orbit 16TC bilayer platform. Nanion has hired more than twenty new employees globally in 2021 and our business keeps growing strongly, in fact, with an accelerated growth rate. We do our best to keep it this way and look forward to a bright year 2022 full of innovation and new opportunities.



On behalf of Nanion, I would like to wish you all the very best for a happy and prosperous 2022 full of joy and success. Thank you for your trust in us and our automated electrophysiology solutions – and

Happy Birthday Nanion!!

Niels Fertig
CEO, Nanion Technologies

Making the most of hybrid life

We were disappointed not to be able to meet you in Boston for the Annual meeting of the Biophysical Society in February 2021. However, we did enjoy a number of exceptional talks and entertaining online networking at the virtual Drug Discovery for Ion Channels satellite meeting which we organized in collaboration with Metrion, SB Drug Discovery, Sophion and Fluxion.

Research Insji[ghts: Cardiac Safety Symposium

Following on the online theme, Nanon organized a cardiac safety symposium in May 2021. We enjoyed 15 outstanding talks from worldwide experts in the field of safety pharmacology with some lively roundtable discussions and networking opportunities. With over 200 attendees the symposium was a great success, something we will no doubt repeat in the coming years.



Virtual and in-person conferences

We were happy to interact with our customers, collaborators and indeed meet new clients at a number of virtual events in 2021 including Physiology 2021, Eurotox, SPS and Neuroscience 2021 where our accompanying virtual networking event alongside the Neuroscience meeting was well received (re-watch the event [here](#)). We were also delighted to meet some of you in person at the ELRIG meeting in Liverpool, UK, and at our hybrid Nanon User Meeting 2021.

Nanon Hybrid User Meeting 2021



We were able to welcome over 20 guests to our headquarters in Munich, whilst more than 100 of you joined us online for 19 fantastic talks with topics ranging from nanopores to pig atrial cells and from CFTR to sodium channels. Port-a-Patch Product Manager, Patrick Mumm, cooked up a storm for all our attendees joining us in Munich, proving that he is a man of many talents. A big thank you to everyone for joining us either online or on-site and an especially big thank you to all our speakers for taking the time to prepare such wonderful talks. We look forward to meeting you more often in 2022 and are already planning to attend several meetings in-person including the BPS meeting and Drug Discovery for Ion Channels XXII satellite meeting in sunny San Francisco next month (pandemic permitting)!

Hybrid working

Along with hybrid meetings, our colleagues at Nanon have been continuing with hybrid working, spending their time between the office and working at home to ensure that there has been no interruption in service, support, device and chip production for our customers. The safety of our employees and customers is paramount to us so we have been careful to follow government guidelines, wearing masks, socially distancing and regular testing.

FDA acquires SyncroPatch 384 for cardiac safety testing

At the end of 2021, we were more than pleased to install our new SyncroPatch 384 at the U.S. Food and Drug Administration (FDA) in Maryland. After a rigorous selection process, the FDA decided for the SyncroPatch 384 to be used in their ion channel safety assessments.

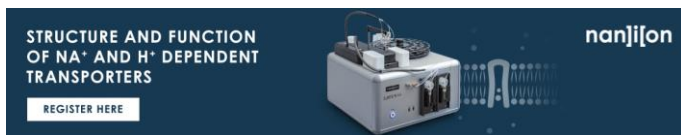
Nanon Technologies in 2021

nan|j|on

We are delighted that Nanion's instrumentation will support the FDA's responsibility to protect public health by ensuring the safety, efficacy, and security of human and veterinary drugs, biological products, vaccines etc. With the ongoing CiPA activities and new guidelines and regulations under way, this clearly showcases the importance of automated patch clamp in drug safety assessment.



Research Insj|ghts: Transporter Webinar Series



One of the highlights in our virtual calendar last year was the Research Insj|ghts: Transporter Webinar Series which included 5 sessions (a collective total of 10 scientific presentations/talks; representing academia & industry alike) scheduled across 2021. In the webinar series we heard a variety of talks focussing on transporters from a number of SURFE²R N1 users, including two of our grant winners from 2018 and 2019. The talks ranged from academic research on bacterial transporters through to screening for inhibitors of B0AT1 in an industrial setting and using the SURFE²R 96SE in a contract research organisation.

SURF-iving the pandemic and giving back to the community



Since 2018, Nanion has been offering scientists the opportunity to win one of our instruments for a 9-month period. In 2018 and 2019 we gave 2 laboratories SURFE²R N1 instruments, in 2020 we gave 2 institutes FLEXcyte 96 instruments and 2 research groups SyncroPatch 384i devices. This year we gave researchers the chance to win a SURFE²R N1 instrument. There were so many great proposals, the grant committee had a hard time making a decision. In the end, we decided to give instruments regionally to the following laboratories:

[Jonai Pujol \(University of Bern\)](#)

[Edmund Kunji \(University of Cambridge\)](#)

[Lei Zheng \(University of Texas - Houston\)](#)

[Ronald Clarke \(University of Sydney\)](#)

[Watch the moment](#) each of these groups found out they were the winners of the 2021 research grant award! We are looking forward to finding out more about their research using the SURFE²R N1 instrument.

Continuous innovatj|on

In 2021 we launched two new products, the new SyncroPatch 384 and the Orbit 16 TC. Both instruments built on the success of their predecessors, with improvements to both hardware and software. [The SyncroPatch 384](#) now comes with a sophisticated temperature control as standard, which can both heat as well as cool. With the 32-well mode, the instrument can be literally turned into a lower throughput instrument for smaller screening projects and assay development. This makes the SyncroPatch 384 even more cost-effective, as part of the chip can be used at a time and the remaining chip can be used later, even over several days. We have also introduced a new consumable for the SyncroPatch 384, the NPC-384T which uses thin glass which reduces the access resistance and improves voltage control.

There is no F in APC

An ongoing development project has been looking at different internal recording solutions. Internal solutions containing fluoride are very widespread in automated patch clamp to foster the sealing process and thereby maintain high recording quality and increase success rates. As fluoride can affect intracellular signalling pathways, we have been working on a method which uses a fluoride-free physiological internal solution for specific applications where this is required on the SyncroPatch 384. More information to this approach will be available in Q1 2022!

The new and improved Orbit 16 TC

The Orbit 16 TC has a considerably smaller footprint than its predecessor, the Orbit 16, has an in-built low-noise 16 channel amplifier (Elements S.R.L.), and automated temperature control with a range from 5 - 50°C.

PatchControl HT software upgrade

In addition to product launches, we also released a new version of the Patchliner software. This software upgrade includes a simplified user interface, expert and user mode for ease-of-use but maintaining flexibility, and easy operation via tabs for assay selection, running an experiment and replay of data. What is more, the software interface is based on the SyncroPatch 384 software for easier transition between instruments. Find out more about the software upgrade in the [flyer](#) and [video](#) of the Patchliner!

Exceptional Publications and Research

We are always thrilled and humbled by the high-quality research that is performed using Nanion instrumentation and in 2021 it was no different. In 2021 over 120 papers were published across the instruments in high-ranking peer-reviewed publications such as Nature, Nature Communications, Journal of General Physiology and Journal of Physiology. This year it was the SyncroPatch 384 which topped the bill with 35 publications in one year! Our own scientists were busy contributing to scientific journals, authoring 3 papers and 1 book chapter.

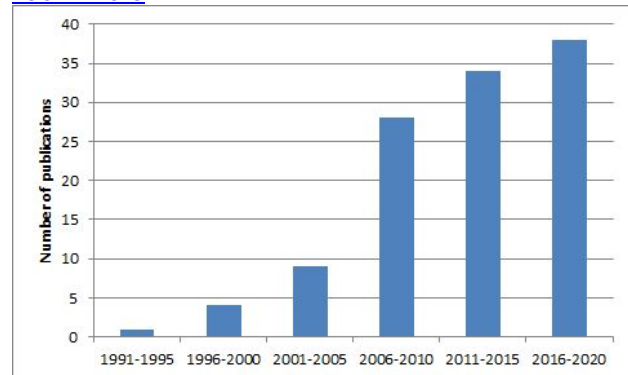
SSM-based electrophysiology publications on the rise

SSM-based electrophysiology has been featured in over 100 publications since 1993. In 2021 the SURFE²R technology

backed up scientific research in high impact journals such as Nature Communications and Select Science.

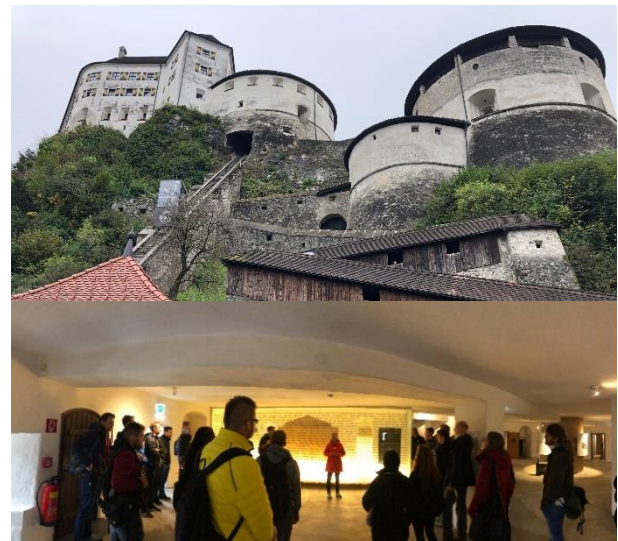
If you are working with Membrane Transporters and interested in characterizing transporter function, then this technology is for you!

[Learn More](#)



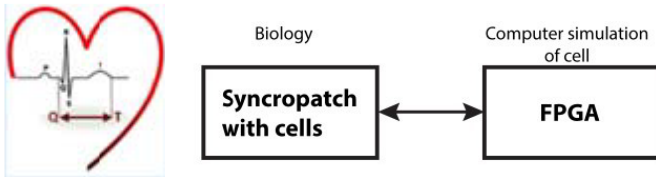
Nanion Day Out in Kufstein

Over the summer the pandemic situation looked to be improving and restrictions were lifted enough that Nanion's colleagues could spend a day out together in Kufstein, Austria. On a chilly autumn day in October, we enjoyed a guided tour of the castle at Kufstein, and enjoyed a delicious lunch at a lakeside restaurant, some of our braver colleagues, including CTO Michael George, even enjoyed a swim in the lake 'Hechtsee' with a bracing water temperature of approximately 15°C! After a short and impressive gorge walk, we had dinner and a beer together at a beer garden before heading back to Munich in the evening. A thoroughly enjoyable day!



EUROstars grant

To further enhance the application range and impact of our technology portfolio, Nanion has engaged in a development project for implementing dynamic clamp in HTS patch clamping. This is done in the cooperative R&D project HybridHeart together with our partners elements in Italy and Teun deBoer at University Utrecht. We were excited to be one of the successful EU grant proposals to be chosen for funding in 2021.



Integration of dynamic clamp capabilities in a HTS APC instrument will enable direct electric coupling of biological cells and in-silico simulations. In addressing the pressing need for prediction of human cardiac risk, industry and regulatory consensus is that patch clamp data from heterologous ion channels and cardiomyocytes is required for modelling cardiac risk and arrhythmia. In HybridHeart, we aim to develop an innovative screening platform for drug effects on ion channels, enabling drug function and safety assessment by combining in-silico and in-vitro assay technologies. Work has begun, and we look forward to continuing this exciting development with our expert partners over the next two years.

As always, a big thanks to YOU!

After 20 years we continue to learn and grow as a company and as a team, but all of this would not be possible without our dedicated team of colleagues, our customers, collaborators, distributors and partners.

We thank you for your trust in us, for sharing your experience and research with us, and for helping make Nanion what it is today, an innovative company at the cutting edge of research and drug discovery. We are proud of what we have achieved as a company and as a team, and we will continue in 2022 doing what we do best, making innovative products and supporting our customers to do their best research. We hope we can celebrate our 20-year anniversary with you this year, and we certainly hope we can meet in person this year at conferences, at our headquarters for our annual user meeting, and at your premises for demonstrations, installations and training. We

wish you all the best for 2022 and look forward to working with you!

Celebrating 20 Years

[Click here](#) to learn more about Nanion throughout the years.

