Column: From the Editor-in-Chief

The New Normal

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***Abstract*—It is the end of summer. What many thought would simply be a "bad start" into the year has proven to have a longer lasting effect. With COVID-19 infections still (or again) on the rise around the world, what lies ahead for research and education in our field?**

I JUST RETURNED from a two-week beach vacation in neighboring Italy. What might have been a rather normal activity in other years, now raises eyebrows: envy from far-away friends who still experience national travel restrictions; suspicion from my fellow citizens whether I brought back any COVID-19 infection! Luckily, I managed to return just before rising infection numbers across Europe prompted many national governments to impose lengthy quarantine rules on holiday traveler. Still, compared to other countries, most notably the U.S., many European travelers enjoyed at least a few weeks of almost unrestricted holiday travels these past weeks.

Back in the office, it is now time for me to plan the upcoming fall semester, as well as restart our research activities after team members get back to work. Though "get back" of course is not necessarily meant in a physical sense—many colleagues still prefer to work from home, even if the University has long since opened its campus for staff and students (obviously, with social distancing rules in place). Yet, this physical presence (or better: the lack thereof) will define much of our work in the upcoming months, forcing us to come up with new routines.

VIRTUAL CLASSROOMS

Universities around the world are battling with delivering effective teaching in the age of social distancing. In Germany, a recent survey[†] found that over 70% of all universities decided to use a hybrid model where most of the teaching will be online with the occasional in-person teaching module. Only 9% plan the reverse, i.e., in-person teaching with the occasional online module. This is still much better than the situation in the U.S., where many schools decided to cancel all in-person teaching for the upcoming semester and do it all online. Here in Switzerland, many universities are even planning for a "regular" semester, i.e., offering all classes in-person, though obviously with strict hygiene and social distancing rules in place. My department here in Lugano has instead decided on a split teaching mode to lower the size of classes: each week, half of the students will be

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[†]Michael Sommer: Eine respektable Notlösung. Forschung & Lehre, 27(8), pp. 666-667.

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allowed into the classroom while the other half follows online. Having just finished most of our spring semester doing all online teaching, I look forward to being in a classroom again, even if only with half of my students at one time.

Yet for all the challenges that the upcoming semester will bring, it also may bring benefits that last beyond the current pandemic. Before March this year, almost none of our 30+ professors here in the Faculty of Informatics would regularly record their classes so that students could review them in case of absences or for studying. Now, every class in our programs is available as an online recording. Thanks to today's technology, many of these recordings are also easily searchable, by virtue of automated captioning tools. And using the ability to deep-link anywhere into these videos, students in one of my courses have since linked each topic in our class syllabus to the corresponding moment in the recording where I introduce the topic.

Video capture works reasonably well for traditional frontal teaching. More challenging, however, are highly interactive class formats where students are meant to work in groups, or work with physical objects (e.g., electronics). Hopefully, the mixed teaching mode we are planning here may allow for some of this, though the exact manner of how to organize this is yet to be defined. I have started to re-read some of Andrew Kun's *Education and Training* Departments (e.g., his inspiring "Reader and Teacher" article from our April 2020 issue) with a view towards how the new teaching reality will affect these ideas.

While I am thrilled to see a lot of innovation in the remote teaching space (e.g., Microsoft Teams' "Together Mode," real-time subtitles, or the ability to quickly create breakout rooms), I also find myself getting increasingly distracted having to support a "mobile YouTube studio" whenever I go to class, both in terms of the amount of hardware to lug around (tripod, wireless lavalier mic, extra webcam, etc.) and the number of software programs (presentation software, screen recorder, online meeting tool) that I have to start in just the right order so that everything works. Clearly, having a professional recording and streaming system installed in each classroom would be the more sensible solution, yet it is no secret that many universities are struggling with COVID19-induced budget squeezes.

I also wonder about the impact this new type of learning has on students. Having lots of digital recordings and online tools at their disposal will clearly help with preparing for exams, the diminished amount of direct interaction, as well as the fact that much of an instructor's energy will now have to focus on coping with the particular teaching setting, may most likely impact students' learning experience negatively. Depending on the duration that we need to have such special provisions in place, coming generations of students may have a significant disadvantage compared to graduates from 2019! At the same time, many of this year's high school graduates who were originally planning to enter the job market, may now decide to go to university instead, given today's COVID-19 induced hiring freezes. While more students are certainly good for universities, larger classes with less qualified students in a not-ideal teaching setting seems to spell trouble for the upcoming semester.

VIRTUAL DEPLOYMENTS?

Just as challenging as the upcoming teaching semester will be research in the months to come. With some Ph.D. students stuck in their home countries due to travel restrictions or family issues, others unable to commute from neighboring countries (e.g., Italy) due to quarantine rules, and the rest having to work from home every other day due to distancing rules in place for overcrowded Ph.D. student offices, on-campus presence will be at an all-time low. Some colleagues in industrial research have even been told to stay at home for at least a year! Being deprived of "watercooler" moments will certainly put a dent in the usual cauldron of creativity that co-presence offers. But even with most of our research teams "in place," we will also need to account for the different realities the rest of the world is now having to adjust to. If you are working with users, both lab experiments and deployments will prove challenging in the upcoming months.

In most of our work here, we either invite users into our labs for participating in controlled experiments or focus groups. While Switzerland ended its national lockdown months ago, our

university is still restricting campus access to staff and students only, making such invitations impossible to extend. Even if local rules would allow us to invite participants to our building, many potential participants may think twice before joining a lengthy experiment in a small and possibly badly ventilated conference room. For all practical purposes, we will need to rely on remote-only participants (i.e., through phone or video conferencing tools) for the time being.

Similarly, we previously performed long-running experiments (i.e., deployments) in people's homes—some even in the context of Ambient Assisted Living projects that involved the private homes of senior citizens. Even if you would not be part of a vulnerable population, inviting a bunch of students into your home for hours at a time might not look too appealing these days. Clearly, we must be prepared to pivot some of our planned deployments into alternative forms of experiments, e.g., by running the deployment with students in their dorm rooms instead, or by minimizing direct interaction with participants (e.g., mailing the hardware and providing video-based installation guidance). This may mean that we can support fewer participants, and that prototypes must be much more robust so that participants can install and operate them without expert help.

VIRTUAL CAREERS?

While one can file all the above simply as "noise," a nuisance that will intrude in our lives for a while, there might be a bigger issue looming for those that are still in the process of building up their career. Both students and early-stage academics have already been severely impacted by the various lockdowns earlier this year. While most of these have been lifted since, this "new normal" will continue to impact the way knowledge is acquired and ascertained, as well as how we perform research and disseminate its results.

Students that started in Spring semester this year have had most, if not all their courses online! Student life has become much more "distanced," significantly impacting the types of bonds formed during this intense period of one's life. Ph.D. students are similarly affected. Conference, once a staple of network building for academics, has gone mostly virtual. Even if national governments have loosened COVID-19 related lockdowns, international travel is unlikely to pick up anytime soon. A whole generation of Ph.D. students might never get the chance to present their work in-person, nor socialize with peers at the conference dinner. Physical Program Committee meetings, already deemed anachronistic by some even before the pandemic, will most likely continue to be virtual for quite some time (if not forever in most cases), again impacting the ability of early career academics to socialize with their senior peers—who may write that crucial recommendation letter when tenure decisions come up.

Obviously, life will adapt, so maybe what looks grim today might indeed by normal tomorrow. Yet, it could also be that the pandemic might just last long enough to affect the current generation (of students, Ph.D. students, and early career academics), but not long enough as to effect long lasting change. In 1–2 years, everything might be back to the "old" normal, yet those that had crucial moments of their careers happen between, say, March 2020 and March 2022, might have just had lots of back luck. Let us hope that this pandemic will be under control much sooner, or that we can indeed adapt fast enough!

IN THIS ISSUE

The title of this special issue is "Pervasive Computing at the Edge," and Guest Editors Victor Bahl, Ramon Caceres, Nigel Davies, and Roy Want selected two articles that offer insights into key challenges at the "edge" of computing. You can find more details in their Guest Editors' Introduction later in this issue.

We also have five timely departments in this issue, many of which focus directly on COVID-19 and its implications: Conferences, Education and Training, Pervasive Health, Smart Homes, and Wearable Computing.

In the Conferences department, authors Viktor Matkovic, Jaelle Scheuerman, Madeleine Steeds, and Sarah Turner give a COVID-19-related account on "Attending Doctoral Events—Experiences and Lessons." While all four authors agree that virtual events do not fully replicate in-person interactions, they nevertheless have also positive takeaways, such as the ease of participating without costly travel, and that well-organized meetings

can still support the creation of a personal network.

The Education and Training department also focuses on how COVID-19 has impacted our lives: authors Susanne Boll, Tjado Ihmels, Tobias Lunte, and Heiko Müller report on their "Experiences from teaching a hardware-oriented course remotely." Their Makers' Lab course, which traditionally is centered around in-person teamwork, had to be transitioned to a fully online format. It is encouraging to read how quickly they adapted their class to make it work online. It certainly gives hope that even such inherently team-oriented classes can work during a pandemic!

In our Pervasive Health department, editor Gabriela Marcu and colleagues report on "Empowering communities with a smartphone-based response network for opioid overdoses." While not directly comparable with the various app-related responses to the COVID-19 pandemic, it still is a fascinating account on how a carefully designed mobile app can make a substantial difference, both by improving the reaction time of Emergency Medical Services, as well as enabling nearby volunteers to help.

In our Smart Homes department titled "When mental models grow (c)old: A cognitive perspective on home heating automation," author Christina Bremer looks at how mental models affect our interaction with a Smart Home's heating system. Reviewing prior work and several recent studies in the smart homes space, Bremer argues that any "smart" heating system will need to be understandable to the occupants to avoid lengthy problem-solving in case of failures or unwanted behavior. Even the smartest system will, when not properly accommodating users' mental models, ultimately fail to win user trust.

Finally, our Wearable Computing department features a very timely contribution by Oliver Amft, Luis Lopera, Paul Lukowicz, Sizhen Bian, and Paul Burggraf. Their contribution titled "Wearables to Fight COVID-19: From symptom tracking to contact tracing" offers an in-depth overview on the various worldwide efforts in this space. They conclude that a welcomed side effect of this global pandemic might be a renewed interest in the use of wearables for telehealth.

TEAM UPDATES

In this issue, we say good-bye to long-term Editorial Board member Shwetak Patel. I sincerely thank Shwetak for his strong support of the magazine over the years and hope that we will still see much of his work featured here, Thank you!

I am also excited to welcome a new Editorial Board member, Dr. Claudio Pinhanez! Claudio works for IBM Research in Brazil, where he works on next-generation conversational systems. He holds a Ph.D. degree from the MIT Media Laboratory. You can contact Claudio at claudio@pinhanez.com. I am very much looking forward to having Claudio on our Team!

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