

Christian Zünd

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EDUCATION	<i>PhD candidate</i> , Zurich Graduate School of Economics University of Zurich GPA 5.9 / 6.0 (summa cum laude)	09/2014–04/2020
	<i>Visiting scholar</i> , Department of Economics Centre for Experimental Social Science University of Oxford (Nuffield College)	10/2018–06/2019
	<i>MPhil</i> , Economic Research University of Cambridge (Trinity College) GPA 75 / 100 (distinction)	09/2013–08/2014
	<i>BA</i> , Economics University of Zurich GPA 5.75 / 6.0 (summa cum laude)	09/2010–07/2013
	<i>Gymnasial Matura</i> (University Entrance Certificate) Kantonsschule Zurich Oerlikon Major Subject: Physics and Applied Mathematics	08/2003–08/2009
PUBLICATIONS	Cohn, A., Maréchal, M. A., Tannenbaum, D., & Zünd, C. L. (2019). Civic honesty around the globe. <i>Science</i> , 365(6448), 70–73. Commentary: Shalvi, S. (2019). Financial temptation increases civic honesty. <i>Science</i> , 365(6448), 29-30. Linnér, R. K., et al. (2019). Genome-wide association analyses of risk tolerance and risky behaviors in over 1 million individuals identify hundreds of loci and shared genetic influences. <i>Nature genetics</i> , 51(2), 245–257.	
SCHOLARSHIPS	<i>Dissertation Fellowship</i> , Department of Economics, University of Zurich <i>SNF Doc.Mobility Fellowship</i> , Swiss National Science Fund <i>Excellence Scholarship</i> , Excellence Foundation Zurich <i>Cambridge Trust Scholarship</i> , Cambridge Trust (declined)	08/2019 08/2018 09/2014 03/2014
PROGRAMMING	<i>Scientific computation</i> : Python, Matlab, Mathematica <i>Statistical packages</i> : Stata, R <i>Bioinformatics</i> : R Bioconductor, Biopython, Plink <i>Machine learning</i> : Pytorch, Tensorflow, Keras <i>Web development</i> : PHP, Javascript, html	

SPECIAL TRAINING	<i>RSF Summer Institute in Behavioral Economics</i>	06/2018
	Russell Sage Foundation (RSF), Waterville Valley, USA	
	<i>Winterschool in Practical Artificial Intelligence</i>	01/2018
	Research Council of Norway and SINTEF, Geilo, Norway	
	<i>RSF Summer Institute in Social Science Genomics</i>	06/2017
	Russell Sage Foundation (RSF), Santa Barbara, USA	
WORK EXPERIENCE	<i>ETH Zurich</i>	2016–2018
	Graduate-level courses in Bioinformatics, Functional Genomics, Cancer Genetics, and Evolutionary Biology.	
	<i>Udacity Nanodegree</i>	Spring 2020
	Deep Reinforcement Learning (4 months)	
TEACHING EXPERIENCE	<i>Coursera Specialization</i>	Spring 2020
	Machine Learning and Reinforcement Learning in Finance (4 courses)	
	<i>Executive Assistant (Swiss Civil Service), Hospital Zollikerberg</i>	02/2017–04/2018
COMMUNITY SERVICE	<i>Research Assistant, University of Zurich</i>	04/2012–07/2013
	<i>Internship (IT and operations), AXA-Winterthur Insurance</i>	10/2009–03/2010
	<i>Programming for PhD Students, University of Zurich</i>	Fall 2018
LANGUAGE SKILLS	<i>Advanced Microeconomics I, University of Zurich</i>	Fall 2017
	<i>BA- and MA-Thesis Supervision, University of Zurich:</i> Thomas Braschler, Flavio Caderas, Karim Ben Hassine, Flurin Noldin, Nicolas Sampl, Noemi Heller, Seït Käch, Jan Aeberhard, Cosma Gabalio, Marco Schwarz, Ninjas Zegg, David Saitta, Felix Wüthrich	
	<i>Jugend + Sport:</i>	since 2008
LANGUAGE SKILLS	J+S Leader and J+S Camp Leader in the Lagersport & Trekking division of Switzerland's largest sports promotion program.	
	<i>BESJ:</i>	since 2009
	Course instructor for a major scouting organization in Switzerland. Development and organization of training modules for young scouting and floorball group leaders.	
LANGUAGE SKILLS	<i>Eagles-Jungschar:</i>	2004–2018
	Group-leader, team-leader (since 2008), and chief-scout (since 2014) of Switzerland's largest scout group. Organizing weekly activities and youth-camps for 120 children. Responsibility for a team of 35 and an annual budget of CHF 50'000.	
	English C2 (CPE), German C2 (native), French B2 (good)	

**PROJECTS IN
BEHAVIOURAL
ECONOMICS**

"It's not all about the money: How corruption undermines policy effectiveness" (Job Market Paper)

The paper demonstrates how corruption negatively impacts policy effectiveness in a program that is explicitly designed to have strong safeguards against corruption, Brazil's Bolsa Família cash transfer program. Bolsa Família makes monthly payments to millions of families, transferring funds directly to beneficiaries so that local officials cannot pocket the money. Moreover, the selection of beneficiaries is anonymized and conducted through a central algorithm to prevent clientelism. By using data from the Cadastro Único, the official database used for beneficiary selection, I can reconstruct the algorithm's priority strata to identify families on the margin of the program that were randomly included or not included in Bolsa Família. This allows me to estimate the program's causal effect on school enrolment in different years and municipalities. I then show that Bolsa Família's effectiveness increases by a third after a municipality has been audited at random. Using a theoretical model, administrative data, and a field experiment with 6,998 registration centres, I find that local corruption increases the probability that families successfully underreport their income when registering for Bolsa Família, undermining the program's ability to target the families that benefit most.

Machine learning: Natural language processing to extract data from Brazilian audit reports.

Programming: Analysis data from the Cadastro Único ($N = 500,000,000$) and Bolsa Família payments ($N = 2,000,000,000$). Private email server for experiment with registration centres, scraping contact details from web directories.

"Bolsa Família and civic behaviour"

As poverty-relief programs expand, concerns are being raised about their effect not only in economic terms but also regarding their impact on the very fabric of society. Critics argue that welfare programs offer means to curry favor with voters and erode civic responsibility through wide-spread abuse of the social system. To test how inclusion in Bolsa Família shapes civic behavior, I am collaborating on a lab-in-the-field experiment conducted over mobile phones. Building on the identification strategy I develop in my job market paper, pairs of families are recruited such that one family has randomly been exposed to Bolsa Família for a significantly longer time. The experiment measures attitudes towards welfare fraud and towards selling one's political voice under the threat of exclusion from the welfare program, and it also assess the willingness to cheat fellow-citizens, to illegitimately claim government benefits, and to take advantage of the study (by sharing the incentivized survey despite being instructed not to do so).

Programming: Automating recruitment and reimbursement of experimental participants on mobile phones using the API's of Plivo (automatic SMS and phone calls) and bitrefill (mobile payments).

"Civic honesty around the globe", Science, 365(6448), 70–73, 2019.

In my first year of graduate school, I joined Michel Maréchal and Alain Cohn to investigate how incentives affect honesty as measured by the willingness to return lost wallets. We turned in more than 17,000 apparently lost wallets (containing business cards, a shopping list, some money, and a key) at the reception desks of public and private institutions in 40 countries. We varied the amount of money that the wallets contained, including either no money, about 13 USD, or almost 100 USD. Surprisingly,

money increases the number of people who try to return the wallet. This result is truly a global phenomenon—in virtually all countries, wallets with money were more likely to be reported. The same holds for different institutions and demographic groups. To identify the motives to keep or return the wallet, we conducted additional treatments and nationally representative online experiments in three countries. The results suggest that a combination of altruism and an aversion to stealing drive a finder's behaviour. In the extensive supplementary materials, we show that other motives such as finder's fees or the risk of detection have little explanatory power and we build on a rich literature of cross-country studies to explain the observed reporting rates.

Programming: Private email server to automatically record and reply to attempts to report the lost wallet. Scraping contacts for expert sample from the RePEC directory.

"Income inequality and populism"

Motivated in part by the negative correlation with income inequality in our lost wallet study, we began to think about how changes in income inequality affect civic preferences and behaviour. Among the hypothesised consequences of increasing inequality is the current surge in right-wing populism. Michel Maréchal, Alain Cohn, Leandro Carvalho and I are conducting a field-experiment to study the effects of increasing income inequality on political extremism in Dutch neighbourhoods. As neighbourhoods with high and low inequality differ from each other in many other ways, isolating the effect of inequality is challenging. We exploit exogenous variation in income inequality generated by the popular Dutch Postcode Lottery. Each week, the lottery's "street prize" goes to a postcode of about 20 addresses, and residents who subscribed to the lottery win from €12,500 to €75,000, depending on the type of subscription they have. By comparing areas around postcodes that recently won the street prize to areas around winners of smaller prizes (e.g., musical tickets), we can estimate the causal effect of a random change in neighbourhood income inequality. After a postcode has won, we invite nearby households to a survey experiment that combines questions about political attitudes and views on populist policies with incentivised tasks where subjects can make real donations to various political parties and causes.

Programming: Automating recruitment and reimbursement of experimental participants using the API's of postcode.nl (geocoded addresses), post.nl (automatic mailings), and VVV (online giftcards).

PROJECTS IN BEHAVIOURAL GENETICS

"Genome-wide association analyses of risk tolerance and risky behaviors in over 1 million individuals identify hundreds of loci and shared genetic influences", *Nature Genetics*, 51(2), 245–257, 2019.

Together with the Social Science Genetic Association Consortium, I studied the genetics of risk tolerance. We conducted a genome-wide association study (GWAS) using data on approximately one million individuals from the UK Biobank, the Health and Retirement Study, and proprietary data from 23andMe, among other sources. We identified 611 genetic loci associated with measures of risk tolerance or risky behaviour, including 124 associated with the standard risk tolerance question ("Would you describe yourself as someone who takes risks?"). We found substantial genetic correlations with several risky behaviours, including speeding, health-related habits such as smoking and drinking, and risky sexual behaviours. Moreover, polygenic scores constructed from the GWAS predict various behaviours of interest to the social sciences, including related personality traits, health-related behaviours, and economic decisions.

Programming: Implementing Multi-Trait Analysis of GWAS (MTAG) to jointly analyze GWAS results for several related traits. Automating pipeline for testing the predictive power for multiple phenotypes in different samples.

"Genes, pubs, and drinks"

While existing research robustly shows that our genes affect how much alcohol people drink, it is unclear what this implies for effective alcohol licensing policy. In a joint project, Pietro Biroli and I analyze how people's genetic propensity to drink moderates their consumption behavior in response to changes in alcohol availability and licensing policy. We combine data from the UK Biobank with geo-coded data on pubs and retailers, as well as data on alcohol licensing from local licensing boards in England and Wales. This allows us to construct a fine-grained measure of local alcohol availability for each one of the approximately 500,000 participants in the UK Biobank. Our preliminary results show that individuals with a high genetic propensity to drink self-select into environments with easier access to alcohol, react less to changes in the availability of alcohol, and respond less to restrictive licensing. Importantly, while local licensing authorities are allowed to consider the effects of pubs on children, crime, or public disturbance, they cannot base their decision on public health factors, which mitigates concerns of reverse causality. Using data on co-morbidity and hospitalizations, we quantify the effect from a public health perspective, showing that the majority of alcohol-related public health costs is attributable to individuals with the highest polygenic risk. Thus, we show that supply-focused licensing policy to mitigate alcohol abuse can clash with individual predispositions and might exacerbate genetic inequality, suggesting the need for a more targeted approach.

Programming: Construction of polygenic risk scores using SNP data from the UK Biobank. Scarping geocoded data on pubs and retailers from various pub guides and Google Maps.

"Improving poly-genetic prediction with machine learning "

Polygenic risk scores, the most widely used method for predicting individuals' traits from their genome, originated from genome-wide association studies (GWAS). As a result, they are constrained by strong linearity assumptions and can use only GWAS summary statistics. While these constraints are essential for researchers interested in discovering which parts of the genome are responsible for a particular phenotype, they are unnecessary if the aim is to make the most accurate predictions about traits and behaviours. Together with Pietro Biroli, I develop machine learning techniques that significantly increase the power to predict traits and behaviours in smaller samples. The algorithm first applies random forests to select a subsample of mutations with high predictive power, before using a deep neural architecture to model non-linearities. The algorithm is recursively applied, and Bayesian optimization is used to tune the hyperparameters for the next iteration of the model. Our method vastly outperforms the state-of-the-art polygenic risk scores for benchmark traits (BMI and height), increasing predictive power by a factor of 10 in small samples (< 40,000 individuals), and by a factor of 4 in medium-sized samples (40,000-200,000 individuals).

Machine learning: Random forests (SNP selection), deep neural networks (polygenic prediction), Bayesian optimization (hyper-parameter tuning).