

# Sebastian Krantz

Junior Researcher in the Africa Initiative at Kiel Institute for the World Economy

\*30.03.1993 in Los Gatos (CA, USA) / Nationality: German & American / Tel.: +4915787972436 /  
E-mail: sebastian.krantz@ifw-kiel.de / Address: Königsberger Str. 2, 24161 Altenholz, Germany

## Core Competencies

- Economic Research and Analysis in both Academic and Policy Contexts
- Strong Skills in Econometrics, Time Series, and Machine Learning, and some familiarity with DSGE, CGE, and Quantitative Spatial Models
- High-Performance Statistical Software Engineering and Full-Stack Web-Application and API Development
- 2 Years of Experience in Macroeconomic Policy Making in African Economies

## Education

**PhD in Quantitative Economics**, CAU Kiel and IfW Kiel. Kiel, Germany. 10.2021–(current)

**Output so far:** Papers on Africa's Great Moderation (forthcoming JAE), GVCs in the EAC (R&R RoWE), and Mapping Africa's Infrastructure Potential (SSRN WP).

Developed [Africa Monitor Platform](#), the [South African Macroeconomic Database](#) and [Nowcast](#). Delivered revenue forecasting workshop in the finance ministry of Benin.

**Master in International Economics (MIE)**, Graduate Institute of International and Development Studies (IHEID), Geneva, Switzerland. 09.2017–09.2019

**Focus:** Macroeconomics, Development, Econometrics, Trade. **GPA:** 5.54 of 6

**Dissertation:** [Endogenous R&D and Technology Diffusion in a Multi-Sector RBC Economy](#) (Keywords: Macroeconomics, DSGE, Business Cycles). *Supervisor:* Prof. Cédric Tille, *Second Reader:* Prof. Rahul Mukherjee.

**BA. Liberal Arts and Science, Magna cum Laude**, University College Roosevelt (UCR) - Liberal Arts & Sciences Honors College, The Netherlands. 09.2014–06.2017

**Major:** Economics and Social Science (Economics, IR, Anthropology, Law, History), **Minor 1:** Mathematics, **Minor 2:** Statistics. **GPA:** 3.87 of 4

**Honors Thesis:** [The Interdependence of Economic Growth, Human Development, and Political Institutions: A General Equilibrium Framework](#)

## Employment

**Junior Researcher in the Africa Initiative at IfW Kiel** 10.2021-current

The [Kiel Institute for the World Economy](#) (IfW) is a leading think tank on global economic affairs. 2021 saw the start of [research initiatives](#) on Africa and China. I was hired for the former and hold a 75% researcher position at IfW while pursuing the PhD in Quantitative Economics at the University of Kiel. I have written papers on macroeconomic stability, GVC-related trade, and the economic effects of infrastructure in Africa. I have also developed the [Africa Monitor](#): a modern macroeconomic information platform for Africa. The [infrastructure paper](#) is a large research effort I am currently advancing that analyzes rich and granular geospatial data on Africa's Infrastructure with causal ML methods.

## Senior Economist (ODI Fellow) in the Macroeconomic Policy Department, Ministry of Finance, Planning and Economic Development, Uganda.

01.2020-09.2021

### **Analytics & Research**

Macroeconometric analysis of planned increase in excise duties on petrol and diesel. Econometric estimation of elasticity parameters for a CGE model to evaluate social policies. Paper on macroeconomic monitoring and development of a GDP nowcast. COVID-19 tourism sector emergency response paper. Strategy paper investigating the potential of cultural tourism development. Work with World Bank team to update adjusted macroeconomic indicators for Uganda and developed model to forecast them. Developed model to perform disaggregated annual revenue forecasting by tax head + short-term (monthly, quarterly) models. Started work to revise financial programming model used in the department. Research paper on macroeconomic dynamics and the effects of fiscal spending in Uganda (SVAR + fiscal multiplier analysis). Research paper on GVCs and RVCs in the EAC and their effects on productivity (enhanced at the Kiel Institute, now R&R at Review of World Economics).

### **IT and Process Innovation**

Scraped >10,000 macroeconomic indicators from national sources and IMF + World Bank, and coded >3000 national indicators. Developed [UGATSDB](#): a mixed frequency time series database to store this data, with monthly updates. Developed open-access [online data portal and R API package](#) for easy data retrieval. The database facilitates analysis and powers a [macroeconomic dashboard](#) that displays the GDP nowcast and leading economic indicators. Automated the department's monthly economic performance report using computable documents (Rmarkdown) linking to UGATSDB. Built a modern department [website](#) integrating these services and making accessible all public department reports.

### **Teaching and Capacity Building**

Structured R-based [Data Science Training Programme](#) consisting of 6 delivered 2-day intensive courses taught in monthly intervals. Followed actively by 2 junior staff from the department, which now maintain the website, database, apps, and computable monthly report. Some staff from the Uganda Bureau of Statistics (UBOS) also followed the training.

## Research Visits and Internships

### **Visiting Researcher at Stellenbosch University Economics Department**

02.2023-04.2023

Theme: Nowcasting the Economy and Measuring Inequality with Geospatial Data.

(3 Months)

**Outputs:** Developed [SAMADB](#): South Africa Macroeconomic Database, and the [SA Nowcast](#). Both were [presented](#) to a broad audience (incl. Reserve Bank, Statistics South Africa, and the Treasury) at the Bureau of Economic Research (BER). Investigated the potential of geospatial data (nightlights, population, and wealth indices based on big data) to map inequality across space and time, and compared them to estimates from the Spatial Tax Panel. Presented at the department's BBL seminar.

### **Intern in the Chief Economists Office, Oxford Policy Management, Oxford (UK), Project: 'Rapid Technological Change: Challenges and Opportunities' - Assessing the impact of rapid technological change on the developing world.**

07.2018-09.2018

(2 Months)

**Tasks:** Prepared country-specific case studies on Indonesia and Tanzania: Sector-level analysis of pattern of growth, industry structure and the innovation system of these countries based on literature, national accounts and World Bank Enterprise survey data. Developed a semi-automated R code to continue analysis for other countries and delivered a technical seminar on R.

### **Intern in the Research Department, Bangladesh Rural Advancement Committee (BRAC), Kampala (Uganda), Project: 'Secondary Education in Uganda' - Analyzing the quality of secondary education in Uganda.**

01.2018-02.2018

(1 Month+)

**Tasks:** Executed a study: Proposal, survey design + enumerator training, data collection on 500 secondary schools cross-country, data cleaning, data analysis, write-up of research findings. Developed a [web application](#) for semi-automated exploratory analysis and geo-visualization of surveys.

## Publications

- Krantz, S. (2023). Africa's Great Moderation. *Journal of African Economies*, Forthcoming.
- Krantz, S. (2024). Patterns of Global and Regional Value Chain Participation in the EAC. *Review of World Economics (SI on Africa's Regional and Global Integration)*. *Revise and Resubmit*.
- Krantz, S. (2024). collapse: Advanced and Fast Statistical Computing and Data Transformation in R. *Under Review at the Journal of Statistical Software*.
- Krantz, S. (2017). The Interdependence of Economic Growth, Human Development and Political Institutions: A General Equilibrium Framework. *Student Undergraduate Research E-journal*, 3.
- Salam, U., Lee, S., Fullerton, V., Yusuf, Y., Krantz, S., & Henstridge, M. (2018). [Tanzania|Indonesia] Case Study: Rapid Technological Change - Challenges and Opportunities. *Pathways for Prosperity Commission Background Papers*, [7|8]. Oxford, UK

## Software Development

I develop open-source statistical software that satisfies high standards of robustness, numerical accuracy, and performance. My primary language is R (and C/C++ backends for R packages), where I developed packages [collapse](#), [fastverse](#), [dfms](#), [osmclass](#), and API packages [ugatsdb](#), [africamonitor](#) (also for Python), and [samadb](#) (also for Python and Julia). I have contributed to [fixest](#), [plm](#), [decompr](#), and [dggridR](#). My main package [collapse](#) is [benchmarked](#) among the 10 best-performing solutions for database-like operations (top 5 for laptop-grade datasets) and has been downloaded >1.5 million times. I spoke about it at useR2022 and am have submitted an [article](#) to the Journal of Statistical Software.

## Computer and Language Skills

### ANALYTICS & PROGRAMMING

- R (Advanced, Developer)
- C/C++ (Intermediate)
- Python (Intermediate)
- SQL (Intermediate)
- STATA (Intermediate)
- Julia (Beginner)
- Mathematica (Beginner)
- Matlab & Dynare (Beginner)
- GEMPACK (Beginner)
- Linux Server + NGINX (Beginner)

### OFFICE, DATA PRODUCTS, MEDIA

- MS Office & Latex (Intermediate)
- QGIS (Intermediate)
- Shiny Apps (Advanced)
- Plotly Dash Apps (Beginner)
- Simple (HTML & CSS) Websites
- R Packages (Advanced)
- Python Packages (Beginner)
- Julia Packages (Beginner)
- Photo: Lightroom & Photoshop
- Video: IMovie & Premiere Pro

### LANGUAGES

- German (Native)
- English (Fluent)
- French (B1)
- Dutch (A2)
- Spanish (A1)

## Other Skills Trainings

<b>Financial Programming and Policies, Revenue Forecasting, and Macroeconomic Forecasting</b> , IMF Institute for Capacity Building via edX.	2020-2021
<b>Practical CGE Modeling</b> , CoPS - Victoria University. ( <i>2 Week Online Course</i> )	17.07–07.08.2020
<b>The Science and Art of DSGE Modeling</b> , CIMS - University of Surrey. <b>Specialization</b> : Emerging Open Economies. ( <i>5 Day Boot Camp</i> )	03.09–08.09.2018
<b>Big Data in Macroeconomics and Finance</b> , Kiel Institute for the World Economy (IfW). ( <i>6 Day Intensive Summer School</i> )	21.06–27.06.2018
Studied several MOOCS/books on <b>Data Science, ML, and Algorithms</b>	2018-2023

## Academic References

- **Prof. Tobias Heidland** (Director of the RC International Development at IfW and Main Supervisor)
- **Prof. Christoph Trebesch** (Director of the RC International Finance and Macroeconomics at IfW)
- **Prof. Rainer Thiele** (Director of the Kiel Institute Africa Initiative at IfW)
- **Prof. Cédric Tille** (Professor of Economics at IHEID [Teaches Macroeconomics in the MIE],  
Dissertation Supervisor)
- **Prof. Ugo Panizza** (Professor of Economics at IHEID [Teaches Econometrics in the MIE])
- **Dr. Alexei Karas** (Professor of Economics at UCR, Honors Thesis Supervisor)

## Professional References

- **Dr. Albert Musisi** (Commissioner of the Macroeconomic Policy Department, Ministry of Finance,  
Planning and Economic Development of Uganda)
- **Dr. Stevan Lee** (Principal Economist at Oxford Policy Management)