Damien C. Jacques

Consultant in data innovation, PhD

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Summary

Freelance consultant, expert in data innovation for development. Led projects across the globe requiring: (i) designing and implementing algorithms and apps to extract key insights from large unstructured data, (ii) develop strategies to leverage the entire data value chain of companies and development agencies; and (iii) successfully scale up data solutions in complex and multi-stakeholder ecosystem. Strong academic track record through several projects in Data Science and AI for social good (including projects in food security, poverty and agricultural economics). Awarded the Agriculture prize in the Data For Development (D4D) challenge organized by Orange, MIT, and the UN. Worked with US and Belgian universities and various international organizations engaged in development. Hold a Ph.D. in Bioengineering and Agronomy from the catholic University of Louvain.

Education

2013 - 2018 **Ph.D. Degree in Agronomy and Bioengineering**, CATHOLIC UNIVERSITY OF LOUVAIN, Belgium.
Dissertation: *Harnessing the Data Revolution for Food Security and Poverty Mapping: Synergies between Mobile Phone Data, Earth Observation and Official Statistics in Senegal*. Advisors: Prof. Pierre Defourny.

2010 - 2012 **Master's Degree in Bioengineering - Environment**, CATHOLIC UNIVERSITY OF LOUVAIN, Belgium.
Dissertation: *Dry vegetation monitoring in Sahel*. Advisors: Prof. Pierre Defourny, Dr. Pierre Hiernaux, Dr. Laurent Kergoat.

2007 - 2010 **Bachelor's Degree in Bioengineering - Environmental engineering**, UNIVERSITY OF LIÈGE - GEMBLOUX AGROBIOTECH, Belgium.

Experience

2019 - 2020 **Technical & Innovation Expert**, RUBYX, Belgium.
Technical support in the designing and production of decision support applications for microfinance institutions in Africa.

2019 - 2020 **Technical & Innovation Expert**, DALBERG DATA INSIGHTS, Belgium.
Multifaceted responsibility covering business development activities (client prospecting, proposal writing), project management, technical implementation (development of decision making applications and algorithms for analyzing large datasets), external communication (blog writing and promotional video production), conference organization, and strategy consulting. Actively contributed to financial inclusion, epidemiology, food security and poverty-related projects in different countries in Africa and South America involving many international partners such as GIZ, Experian, MTN, GiveDirectly, the World Bank and the Qatar Computing Research Institute.

2019 - 2020 **Research Consultant**, INTER-AMERICAN DEVELOPMENT BANK, Nicaragua.
Research and analysis of a unique mobile phone dataset to study the impact of the socio-economic crisis of April 2018 on poverty in Nicaragua. Preparation of a detailed report including a comprehensive literature review, the results of a predictive (machine learning) and descriptive (statistics and econometrics) analysis of poverty dynamics using relevant variables from the mobile phone data, and a list of recommendations for further research.

2019 **Postdoctoral Researcher**, UNIVERSITY OF CALIFORNIA, LOS ANGELES, USA.
Contribution to a research project on the impact of short and long-term migration derived from census and mobile phone data on HIV prevalence in Botswana.

2017 - 2018 **Research Assistant**, Free University of Brussels, Belgium.
Research work on the study of the dynamics of the Belgian population using mobile phone data. Literature review, statistical analysis of the data, modelling and visualisation of the results through interactive applications.

2013 - 2018 **PhD Candidate**, catholic University of Louvain, Belgium.
Co-author of 10 research papers. Involvement in international projects and consortium (JECAM, D4D, GEOGLAM, SIGMA...). Setting up successful research proposals (BELCAM, Sen2Agri). Communications at international conferences and workshops (CIMMYT, NetMob, AGU, CNES, GV2M...). Master thesis supervision and team work through collaborative research projects.

2012 **Research Assistant**, catholic University of Louvain, Belgium.
Geospatial product development from Satellite imagery for the monitoring of European biodiversity (European Lifewatch project). Identification of the best approach for monitoring and aggregating indicators of ecosystem dynamics.

Research Publications

2020 **Mobile Phone Data for Urban Climate Change Adaptation: Reviewing Applications, Opportunities and Key Challenges**, Sustainability, Co-authors: Dujardin, S., Steele, J., and Linard, C..

2019 **Accuracy requirements for early warning of crop production in Senegal**, arXiv, Co-authors: Defourny, P.

2018 **Mobile Phone Metadata for Development**, arXiv.

A Comparison of Global Agricultural Monitoring Systems and Current Information Gaps. Agricultural Systems., Agricultural systems, Co-authors: Fritz, S., See, L, Laso Bayas, J.C., Waldner, F., Becker-Reshef, I., Whitcraft, A., Baruth, B., Bonifacio, R., et al.

Identifying seasonal mobility profiles from anonymized and aggregated mobile phone data. Application in food security, Plos One, Co-authors: Zufiria, P. J., Pastor-Escuredo, D., Ubeda-Medina, L. A., Hernandez-Medina, M. A., Barriales-Valbuena, I., Morales, A. J., Nkwambi, W., Diop, M. B., Quinn, J., Hidalgo-Sanchis, P., and Luengo-Oroz, M.

Social capital and transaction costs in millet markets, Heliyon, Co-authors: Marinho, E., d'Andrimont, R., Waldner, F., Radoux, J., Gaspart, F., and Defourny, P.

2017 **Combining disparate data sources for improved poverty prediction and mapping**, Proceedings of the National Academy of Sciences, Co-authors: Marinho, E., d'Andrimont, R., Waldner, F., Radoux, J., Gaspart, F., and Defourny, P.

A multi-disciplinary perspective on emergent and future innovations in peer review, F1000Research, Co-authors: Tennant, J. P., Dugan, J. M., Graziotin, D., Waldner, F., Mietchen, D., Elkhatib, Y., Collister, L. B., Pikas, C. K., Crick, T., et al.

Sentinel-2's Potential for Sub-Pixel Landscape Feature Detection, Remote Sensing, Co-authors: Radoux, J., Chomé, G., Waldner, F., Bellemans, N., Matton, N., Lamarche, C., d'Andrimont, R., and Defourny, P.

2016 **The impact of training class proportions on binary cropland classification**, Remote Sensing Letters, Co-authors: Löw, F., and Waldner, F.

The academic, economic and societal impacts of Open Access: an evidence-based review, F1000Research, Co-authors: Tennant, J. P., Waldner, F., Masuzzo, P., Collister, L. B., and Hartgerink, C. H.

A Layered Vegetation Model for GPR Full-Wave Inversion, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, Co-authors: Ardekani, M. R. M., and Lambot, S.

2015 **A dynamic vegetation senescence indicator for near-real-time desert locust habitat monitoring with MODIS**, Remote Sensing, Co-authors: Renier, C., Waldner, F., Babah Ebbe, M. A., Cressman, K., and Defourny, P.

Genesis of millet prices in Senegal: The role of production, markets and their failures, NETMOB, Co-authors: Marinho, E., d'Andrimont, R., Waldner, F. and Radoux, J.

2014 **Monitoring dry vegetation masses in semi-arid areas with MODIS SWIR bands**, REMOTE SENSING OF ENVIRONMENT, Co-authors: Kergoat, L., Hiernaux, P., Mougin, E., and Defourny, P.

GPR data inversion for vegetation layer, 15TH INTERNATIONAL CONFERENCE ON GROUND PENETRATING RADAR, Co-authors: Ardekani, M. R., Neyt, X., Nottebaere, M., and Lambot, S.

Conferences and workshops

2019 **Guest Lecture**, DRAGON TRAINING SCHOOL, BioSense Insitute, Serbia.
Title: Data Innovation for food security: Beyond research and development.

Panelist, DATA SCIENCE GHENT, De Krook, Belgium.
Theme: Data ownership

Organizers, POVERTY MAPPING INITIATIVE, ITU AI for Good Global Summit, Switzerland.
Dalberg Data Insights, the Qatar Computing Research Institute and the World Bank Group convened experts to share knowledge and make plans to better combine traditional development data with complementary sources of big data towards achieving more accurate, timely and cost-effective measures of poverty.

Guest Talk, SKEPTICS IN THE PUB, Belgium.
Title: Introduction to Open Access.

Talk, PH.D. PUBLIC DEFENSE, catholic University of Louvain, Belgium.
Title: Harnessing the Data Revolution for food security and poverty mapping: synergies between mobile phone data, Earth Observation and official statistics in Senegal.

2018 **Talk**, SEMEL INSTITUTE SEMINAR, University of California, Los Angeles, USA.
Title: Introduction to Mobile Phone Metadata.

2017 **Talk**, 6TH EUGEO CONGRESS ON THE GEOGRAPHY OF EUROPE, Académie royale des Sciences, des Lettres et des Beaux-Arts de Belgique, Belgium.
Title: Dynamic population mapping in Belgium using mobile phone data.

Talk, CIMMYT SYSTEMS ANALYSIS WORKSHOP, catholic University of Louvain, Belgium.
Title: Mobile Phone Metadata. Applications.

2016 **Organizers**, PECHAKUCHA NIGHT, Val Benoit, Belgium.
Theme: Open Science (12 speakers, ∼150 p.).

Organizers, PECHAKUCHA NIGHT, La Caserne Fonck, Belgium.
Theme: Invisible Design (12 speakers, ∼200 p.).

Organizers, PECHAKUCHA NIGHT, La Cité Miroir, Belgium.
Theme: Knowledge Mutation (12 speakers, ∼300 p.).

2015 **Poster**, AGU FALL MEETING, Moscone, USA.
Title: Crop monitoring as a tool for modelling the genesis of millet prices in Senegal.

Talk, NETMOB, MIT, USA.
Title: Genesis of millet prices in Senegal: the role of production, markets and their failures.

2014 **Poster**, GLOBAL VEGETATION MONITORING AND MODELING INTERNATIONAL CONFERENCE, France.
Title: Advanced sampling of remote sensing images for area estimation.

2013 **Talk**, SPOT4 (TAKE5) USERS DAY, CNES, France.
Title: Preparing for the exploitation of Sentinel-2 observations for agriculture monitoring.

2012 **Poster**, 4TH AMMA INTERNATIONAL CONFERENCE, Meteo France, France.
Title: Monitoring straw and litter masses with MODIS during the dry season in Sahel.

Awards and grants

2018 **4th place in the Hackathon Hacking for Impact**, MCKINSEY.
Machine learning hackathon on predicting the probability of patient survival based on given variables.

Most Inspiring Project Prize Winner, NASA SPACE APPS CHALLENGE (LIÈGE EDITION).
Prototyping a game application for crowdsourcing validation data for land cover maps.

2015 **$2k Agriculture Prize**, DATA FOR DEVELOPMENT CHALLENGE (D4D).
Social challenge on Big Data in Senegal organized by Orange in collaboration with UN and MIT.

$45k Research Grant, BILL & MELINDA GATES FOUNDATION.
A selection of winning D4D teams (6 out of hundred) received a grant to scale up their solution in Senegal.

2012 **4-year Ph.D Grant**, F.R.S.-FNRS FRIA.
Doctoral scholarship awarded on the basis of a selection process (success rate 25%).

Coursework and trainings

2018 **International School of Physics "Enrico Fermi"**, ITALIAN PHYSICAL SOCIETY, Computational Social Science and Complex Systems.
This school is one of the most significant cultural activities of the Italian Physical Society and has reached considerable international prestige.

2014 **BSE Academy**, IMPULSE BRUSSELS.
Entrepreneurial training program of 3 months.

Entrepreneurship experience

2015 **Food Porn Show**, GASTRONOMICAL RECIPE KITS, Belgium.
Co-founder of an "all-in-one" gastronomical recipe kits delivery service for fine dining recipes. Building the company from 0 to 1: market research, financial analysis, product development, marketing strategy, pre-launch. The project was stopped after the Beta phase.

2014 **Stemgarden**, BRING NATURE BACK TO THE CITY, Belgium.
Selected project for BSE Academy : entrepreneurial training program of 3 months by Impulse Brussels. The initial project was an indoor gardening system in bamboo that has evolved into a web platform for sharing innovative gardening ideas.

Volunteer work

2015 - 2019 **Co-founder of Guru-Gis.net**, CODING BLOG.
Blog on geospatial and remote sensing analysis using R, Qgis and OTB.

2015 - 2017 **Organizers of Pechakucha Night**, GOTORO.
Promote entrepreneurial spirit through the organization of PechaKucha Night conferences in Liège (~200p.).

2014 - 2017 **Member of Focus Research**, BELGIAN RESEARCH POLICY GROUP.
Belgian research lobby. Publication of the Research in Transition (20 000 copies) distributed in all the french-speaking universities in Belgium.

2014 - 2016 **Co-founder of PhD Hub**, BELGIAN NETWORK FOR EARLY CAREER RESEARCHERS.
Networking organisation aiming to connect young Belgian researchers to each other. Organization of Social events for Early Career researchers such as PhD parties (100 - 250 p.).

2014 - 2015 **Belgian delegate of Eurodoc**, EUROPEAN COUNCIL OF DOCTORAL CANDIDATES AND JUNIOR RESEARCHERS.
Federation of 32 national organisations of PhD candidates with the aim of bringing the voice of young researchers to the attention of European policy-makers. Promotion of Open Access in the dedicated Working Group (webinar organization, paper writing).

Skills

Background   I provide both technical and strategic consulting in data innovation. I have a mixed profile combining the mindset of an **(bio-)engineer**, the passion of a **researcher**, the skills of a **data scientist**, the drive of an **entrepreneur** and the agility of a **consultant**.

How I work   For ideation sessions and strategy consulting, I like to tap into the **design-thinking** toolbox to maximize the output of a workshop. I prefer to work in close collaboration with the client if possible **physically** or **remotely** with frequent interactions. As for the technical work, I do my data manipulation, statistical analysis and visualization mainly in **R** (I sometimes use **Python** if necessary). I favour working with a **causal inference** approach rather than pure prediction. That being said, I can run a **machine learning** algorithm if it seems to be the right solution. I like to build **dockerized interactive web applications** to communicate results and support decision making. I develop the backend in **Shiny** with the use of cloud computing technology for database management (example **Big Query**) and hosting. For the front end, I use a classic combination of **HTML**, **javascript** and **CSS**. I share research code and tools on **Github**. I write papers using LATEX. I work best on a **Unix-based** machine.

Languages

Fluent   **French, English**