

DANIEL CZECH

University of California, Berkeley
Citizenship: South Africa, Germany

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<https://github.com/danielczech>

EXPERIENCE

- 2019–pres. - **Postdoctoral Scholar**, University of California, Berkeley.
- Wrote software for custom high-performance computing clusters with 100+ nodes and petabyte-scale storage to automate commensal technosignature searches for [Breakthrough Listen](#).
 - Contributed to the development of both classical and ML-based narrowband radio signal detectors.
 - Developed and implemented target selection algorithms for radio telescope arrays.
- 2016 - **Research Internship (neuromorphic engineering)**, [Singapore Institute for Neurotechnology](#), National University of Singapore (3 months).
- Designed a novel approach for evaluating noise filtering algorithms for silicon retina sensors.
 - Contributed to a Python software library to manipulate raw data from silicon retina sensors.
 - Supervisor: Dr. Garrick Orchard.
- 2013 - **Summer Research Program (computational neuroscience)**, [Queensland Brain Institute](#), University of Queensland, Australia (3 months).
- Wrote software to detect neuron firing patterns in calcium imaging videos of Zebrafish brains.
 - Awarded a scholarship (top ranked student: academic merit and research potential).
 - Supervisors: Prof. G. Goodhill and Dr. L. Avitan.

EDUCATION

- 2014–2019 - **Ph.D. (Electrical Engineering)**, Radar Remote Sensing Group (RRSG), University of Cape Town.
- Topic: Time Domain Classification of Transient Radio Frequency Interference.
 - Supervisors: Prof. M. Inggs and Dr. A. Mishra.
 - Awarded a South African Square Kilometer Array bursary for postgraduate study.
- 2010–2013 - **B.Sc. Engineering (Mechatronics)**, University of Cape Town, first class honours.
- Class medal: Mechatronics (top student in 2nd year).
 - Class medal: Engineering 1 (top student in module).
 - Vice Chancellor's Scholarship (1st year).

SKILLS

- **Languages:** Python (and many libraries), Bash, MATLAB, SQL, [web development](#) (JS, HTML, CSS), some C.
- **Libraries and tools:** Keras (using Tensorflow), Git, Vim, SLURM, Redis, Circus, Singularity (containerisation), Amazon Web Services, casper FPGA toolflow, basic RF front-end design, L^AT_EX.
- High performance computing and networking (custom computing and storage clusters; experience with hardware constraints and trade-offs).

WORKSHOPS AND COURSES

- 2018 - **CASPER Hardware Porting Workshop**, South African Radio Astronomy Observatory (SARAO).
- 2017 - **NSF Telluride Neuromorphic Cognition Engineering Workshop**, Telluride, CO (3 weeks).
- 2014–2017 - **Elective courses:** Advanced Engineering Mathematics, German Language, Neural, Fuzzy & Evolving Systems (University of Cape Town), and Neural Networks and Deep Learning (Coursera).
- 2014 - **4th IUCAF Spectrum Management School**, Santiago, Chile.

OTHER EXPERIENCE

- 2017–pres. - **Supervision:** Supervision of undergraduate REU students (UC Berkeley) and undergraduate senior research projects (University of Cape Town).
- 2017–2021 - **Lecturing:** Courses incl. Data Science for Astronomy (University of Cape Town), the 2019 African Radio Interferometry Winter School, and the SA Radio Astronomy Observatory E-Learning Platform.
- 2018, 2021 - **Reviewing:** Radio Science and The Astronomical Journal.
- 2015–2016 - **Entrepreneurship:** Designed, built and operated an automated breakfast cereal vending machine.

- 2022 - Gajjar, V., LeDuc, D., Chen, J., Siemion, A.P., Sheikh, S.Z., Brzycki, B., Croft, S., **Czech, D.** et al., 2022. [Searching for broadband pulsed beacons from 1883 stars using neural networks.](#) *Accepted for publication in The Astrophysical Journal.*
- Ma, P., Ng, C., Rizk, L., Croft, S., Siemion, A., Brzycki, B., **Czech, D.** et al., 2022. [The first deep-learning search for radio technosignatures from 820 nearby stars.](#) *Submitted.*
- 2021 - **Czech, D.**, Isaacson, H., Pearce, L., Cox, T., Sheikh, S., Brzycki, B., et al., 2021. [The Breakthrough Listen Search for Intelligent Life: MeerKAT Target Selection.](#) *Publications of the Astronomical Society of the Pacific* 133(1024), p.064502.
- Sheikh, S.Z., Smith, S., Price, D.C., DeBoer, D., Lacki, B.C., **Czech, D.J.** et al., 2021. [Analysis of the Breakthrough Listen signal of interest blc1 with a technosignature verification framework.](#) In *Nature Astronomy*, 5(11), pp.1153-1162.
- Smith, S., Price, D.C., Sheikh, S.Z., **Czech, D.J.**, Croft, S., DeBoer, D. et al., 2021. [A radio technosignature search towards Proxima Centauri resulting in a signal of interest.](#) In *Nature Astronomy*, 5(11), pp.1148-1152.
- Price, D.C., MacMahon, D.H., Lebofsky, M., Isaacson, H., Sheikh, S., **Czech, D.**, Gajjar, V., Siemion, A., Drew, J., Worden, S.P. and Green, J.A., 2021. [Expanded Capability of the Breakthrough Listen Parkes Data Recorder for Observations with the UWL Receiver.](#) *Research Notes of the AAS*, 5(5), p.114.
- Hawkins, M.W., **Czech, D.J.**, MacMahon, D.H., Croft, S. and Siemion, A.P., 2021. [High-Performance Radio Telescope Array Data Processing Framework.](#) In *XXXIVth General Assembly and Scientific Symposium of the International Union of Radio Science (URSI GASS)* (pp. 1-4). IEEE.
- 2020 - Brzycki, B., Siemion, A.P., Croft, S., **Czech, D.**, DeBoer, D., DeMarines, J., et al., 2020. [Narrow-band Signal Localization for SETI on Noisy Synthetic Spectrogram Data.](#) *Publications of the Astronomical Society of the Pacific*, 132(1017), p.114501.
- 2019 - Lebofsky, M., Croft, S., Siemion, A.P., Price, D.C., Enriquez, J.E., Isaacson, H., MacMahon, D.H., Anderson, D., Brzycki, B., Cobb, J., **Czech, D.**, DeBoer, D., et al., 2019. [The Breakthrough Listen Search for Intelligent Life: Public Data, Formats, Reduction, and Archiving.](#) *Publications of the Astronomical Society of the Pacific*, 131(1006).
- 2018 - **Czech, D.**, Mishra, A. and Inggs, M., 2018. [A CNN and LSTM-based Approach to Classifying Transient Radio Frequency Interference.](#) *Astronomy and Computing*, 25, pp. 52-57.
- **Czech, D.**, Mishra, A. and Inggs, M., 2018. [A Dictionary Approach to Identifying Transient RFI.](#) *Radio Science*, 53(5), pp. 656-669.
- 2017 - **Czech, D.**, Mishra, A. and Inggs, M., 2017. [Characterizing Transient Radio-Frequency Interference.](#) *Radio Science*, 52(7), pp. 841-851.
- 2016 - **Czech, D.** and Orchard, G., 2016. [Evaluating Noise Filtering for Event-based Asynchronous Change Detection Image Sensors.](#) In *Biomedical Robotics and Biomechatronics (BioRob)*, 2016 6th IEEE International Conference on (pp. 19-24). IEEE.
- **Czech, D.**, Mishra, A. and Inggs, M., 2016. [Identifying Radio Frequency Interference with Hidden Markov Models.](#) In *Radio Frequency Interference (RFI)* (pp. 21-25). IEEE.