Joséphine Wolf Oberholtzer

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Education

Ph.D. & **M.A.**, Music, Harvard University, 2015

Dissertation: *A computational model of music composition*

Documents low and high-level APIs, techniques and tooling for modeling music notation and symbolic music composition in Python, along with examples of musical works built using these tools.

Schloss Solitude Summer Academy, Stuttgart, 2007

B.Mus., Oberlin Conservatory of Music, 2006

Employment

Software Engineer, Cortico, 2021-present

Master Software Engineer, Capital One, 2020-2021

- Assisted with migration of core account and transaction processing off of legacy mainframes and into modern cloud-native implementations.
- Maintained over a dozen Cassandra clusters, addressed security vulnerabilities and other enterprise compliance issues, developed in-house tooling for managing Cassandra schema migrations.
- Implemented Docker-Compose- and Kubernetes-based flavors of performance- and integration-testing environments for hybrid containerized/serverless systems, including push-button pipelines for provisioning K8S-based environments.
- On-call for service outages, incidents, and late-night systems maintenance.

Senior Software Engineer, Capital One, 2018-2020

- Implemented local integration testing for hybrid servered/serverless systems using Docker-Compose, LocalStack, Serverless and Terraform.
- Modernized build pipelines for speed and legibility, wrote shared pipeline libraries, and integrated Jenkins with Slack for better build status visibility.
- Developed workflows for packaging and deploying Serverless applications within CapitalOne's ecosystem.
- Triaged security compliance issues.
- Maintained legacy hotel arbitrage monolith service, added extensive testing, and prepared for switchover to next-generation replacement.
- Architected next-gen event-sourced/CQRS system for hotel arbitrage.
- Implemented entity-resolution microservice for matching hotel names and addresses against Priceline's dataset.
- On-call for service outages and incidents.

Developer, Discogs, 2015-2018

- Refactored and extended test coverage on a large legacy Python 2.7 codebase.
- Prepared the legacy codebase for a potential Python 3 upgrade.

- Developed new features to support the buyer and seller experience, including an improved record collection feature and shipping labels.
- Created and deployed containerized applications to Discogs' Kubernetes cluster.
- On-call for Discogs' central authentication service.
- Instrumented new and existing systems and API integrations.

Research Technical Assistant, MIT Music and Theater Arts Department, 2013-2014

- Implemented API documentation system.
- Refactored and parallelized musical corpus metadata population and search.
- Optimized musical data structures for rapid lookups by timing information.

Teaching Assistant, Harvard University, 2010-2014

- Taught courses related to digital signal processing, interactive software for artists, sound reinforcement and acoustics.
- Led students in installing massively-multi-channel speaker arrays.

Programmer, Forced Exposure, 2006-2008

- Implemented automated documentation preparation workflows for product catalogs and email campaigns.
- Assisted in creation of new B2C mail-order website.

Fields of Interest

Distributed systems architecture

Machine listening and digital musicology

Electro-acoustic music composition and performance

Multi-media and live-electronics programming

Symbolic music composition

Open source software development

Technical Skills

Languages: Python (15 years), C, Golang, Java, Node, Max/MSP, SuperCollider

Development Tools: Unix command line environment, git, vim, LaTeX, GitHub Actions, Docker, Kubernetes

Python-specific Tools: numpy, ply, pytest, sphinx, sqlalchemy

Audio Tools: Ableton, Nuendo, ProTools, Reaper, iZotopeRX

Open-Source Software Development (Selected)

On Exactitude In Science, 2020-present, "Visualizing music as a social graph, redux"

- 3D-visualized music-informatics graph database, featuring hundreds of millions of entities from the discogs.com dataset.
- Aiohttp and aiogremlin on the back-end.
- React and ThreeJS on the front-end.
- Backed by Kubernetes, JanusGraph, ScyllaDB and ElasticSearch

  Live: http://on-exactitude-in.science

  Source: https://github.com/josephine-wolf-oberholtzer/on-exactitude-in-science

Supriya, Author, 2013-present, "A Python interface to SuperCollider"

Documentation: http://supriya.readthedocs.org/en/latest/

Source: https://github.com/supriya-project/supriya

Abjad, Contributor, 2009-present, "A Python API for Formalized Score Control"

Contributions: LilyPond syntax parsing, musical microlanguages, documentation tools, large-scale form control, rhythmic quantization

Documentation: http://abjad.github.io

Source: https://github.com/Abjad/abjad

Music21, Lead Programmer, 2013-2014, "A Toolkit for Computer-Aided Musicology"

Documentation: http://web.mit.edu/music21

Source: https://github.com/cuthbertLab/music21

Sound Design

Stircrazer: Hammer + Flutter, composed by Sabrina Schroeder, 2014

Mixed ensemble with live electronics

Interfacing with the surface, composed by Timothy McCormack, 2013

Trio for horn, cello and synthesizer

Stircrazer (III), composed by Sabrina Schroeder, 2013

Piano solo with live electronics
Premiered at Tzlil Meudcan Festival, Tel Aviv

eyam iv, composed by Ann Cleare, 2013

Bass flute solo, with ensemble and live electronics

Piano Hero 2, composed by Stefan Prins, 2012-13

Piano solo, with live electronics

Generation Kill, composed by Stefan Prins, 2012

Octet for musicians and video-game controllers, with live electronics and video
Premiered at Donaueschingener Musiktage 2012

Ataraxia, composed by Edgar Barroso, 2012

Solo for percussion with live electronics

An Inward Flow, composed by Edgar Barroso, 2011

Duet for mezzo-soprano and tenor saxophone, with live electronics
Performed at the International Computer Music Conference 2012

Teaching Experience

Harvard University

Electroacoustic Seminar, Spring 2014

Teaching Assistant for Aaron Einbond

Introduction to Live Electronics, Spring 2014

Teaching Assistant for Aaron Einbond

Why You Hear What You Hear: The Physics of Acoustics, Spring 2013
Teaching Assistant for Eric Heller

Electroacoustic Seminar, Spring 2013
Teaching Assistant for Hans Tutschku

Harmony in Electronic Dance Music, Spring 2013
Teaching Assistant for Olaf Post

Intimate Sound Installations, Fall 2012
Teaching Assistant for Hans Tutschku

Introduction to Live Electronics, Spring 2012
Teaching Assistant for Hans Tutschku

Electronic Music and Visual Art, Fall 2011
Teaching Assistant for Hans Tutschku

Introduction to Electroacoustic Music, Fall 2011
Teaching Assistant for Hans Tutschku

Intermediate Music Theory for Concentrators, Spring 2011
Teaching Assistant for Olaf Post

Introductory Music Theory for Concentrators, Fall 2010
Teaching Assistant for Olaf Post

Recent Musical Works

Invisible Cities (iii): Ersilia, (7 minutes), 2015
Performed by Ensemble Dal Niente

Invisible Cities (ii): Armilla, (11 minutes), 2015
Performed by Elizabeth Weisser & John Pickford Richards

Invisible Cities (i): Zaira, (10 minutes), 2014
Performed by Ensemble Mosaik

Plague Water, (10 minutes) for saxophone, electric guitar, piano and percussion, 2014
Performed by Ensemble Nikel

Aqua magnanimitatis, (29 minutes) for 8-channel tape, 2013

In the tall grasses, (41 minutes) for 8-channel tape, 2012

Wild Ambition, (16 minutes) for 8-channel tape, 2011
Premiered at the Sackler Art Museum, Cambridge, MA

Mbrsi/Aurora, (10 minutes) for 22 strings, 2011
Premiered by Ensemble Kaleidoskop at the Kammermusiksaal, Berlin

Red Steam, (20 minutes) for 8-channel tape and video, 2011

Silk Method, (12 minutes) for 8-channel tape, 2010

Lagartija, (12 minutes) for piccolo, percussion, violin, and cello, 2010

Publications, peer-reviewed

(2015) T. Bača, **J. Oberholtzer**, J. Treviño and V. Adán.

Abjad: An Open-source Software System for Formalized Score Control.

Proceedings of TENOR 2015, First International Conference on Technologies for Music Notation and Representation.

Presentations

Virtual Score Construction with the Abjad API for Formalized Score Control

Study Day on Computer Simulation of Musical Creativity, University of Huddersfield, 2015.

Abjad: A Python API for Formalized Score Control

Open Space, Internationales Musikinstitut Darmstadt, 2014

Composing at the command line: Symbolic music representation in Python

Boston MusicTechFest, 2014

Abjad: A Python API for Formalized Score Control

University of California at San Diego, 2012

University of California at Santa Barbara, 2012

University of California at Santa Cruz, 2012

Stanford University, 2012

University of California at Berkeley, 2012

SASHA: Saxophone Acoustic Search and Heuristic Analysis

Digital Musicology Workgroup, Harvard University, 2010

Particle Music in Timbral Space

Visiones Sonoras Festival, CMMAS, Morelia, Mexico, 2009

Grants

UCIRA Sorcerer/Alchemy Grant, 2012

Awards

The Harvard University Certificate of Distinction in Teaching, Fall 2014

The John Green Fellowship, 2013

The George Arthur Knight Prize, June 2012

The Harvard University Certificate of Distinction in Teaching, Fall 2013

The Harvard University John Green Fellowship Award, June 2012

The Harvard University Certificate of Distinction in Teaching, Fall 2011

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