

# Christopher James Carr (CJ)

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## RESEARCH INTERESTS

Computational creativity, machine learning, DSP, NLP, music information retrieval, machine perception, stylometry, generative art

## EDUCATION

### NORTHEASTERN UNIVERSITY—*B.Sc. Computer Science*

Boston, MA, 2006-2011

Honors Dean's List, Dean's Scholarship

Major GPA 3.66

Relevant Courses Machine Learning, Linear Algebra, Probability and Statistics, Calculus 2 (Honors), Algorithms and Data, Computer Graphics, Programming Languages, Object-Oriented Design, Software Development, Cognition

## PROFESSIONAL EXPERIENCE

### IDEAFLOW—*Software Engineer, Founding Member, Javascript, React, Node, Meteor, ShareJS, MySQL*

Palo Alto, CA, 2013-2016

Developing a tool for graph-based note-taking.

Developing an OT library for collaborative editing.

### YEGII—*Software Engineer, Python, NLTK, Flask, Javascript*

Cambridge, MA, 2014-2016

Developing NLP algorithm and API for analyzing text documents.

Creating a tool for financial experts to organize thousands of documents.

### BERKLEE COLLEGE OF MUSIC—*Game Developer, Computational Music Researcher, Flash, Javascript, Python*

Boston, MA, 2011-2013

Created Flash and HTML5 games for teaching music theory to middle and high school kids.

Started the *Music Intelligence* project to research MIR algorithms for use in music education tools.

### ANIMAL—*DSP Engineer, Python*

New York, NY, 2013

Created an algorithm that splits music recordings into transient-segments and sorts them by pitch and timbre.

### ULTIMATE YEAR BOOK—*Software Engineer, PHP, Facebook API*

Boston, MA, 2011

Created a photo mosaic generator that renders the front cover.

### FLIPKEY—*Software Engineer, PHP, Javascript, MySQL, Selenium*

Boston, MA, 2009

Tested security of website for XSS/CSRF attacks, developed test suites, implemented features, fixed bugs.

### SMARTER TRAVEL MEDIA—*Software Engineer, PHP, Javascript, MySQL*

Boston, MA, 2008

Implemented features, fixed bugs.

## AWARDS AND HONORS

MusicTechFest Scandi, **Cymatics Challenge winner** for *4D Chladni Patterns*

Umeå, Sweden, 2015

MusicTechFest Boston, **Microsoft prize** for *Hexadecipus*

Boston, MA, 2014

SXSW Hackathon, **Finalist, EchoNest prize** for *Neon*

Austin, TX, 2014

Hacking Audio and Music Research, **Best Hack/Research Direction award** for *Crowd Remix*

New York, NY, 2014

Hacking Audio and Music Research, **Best Code award** for *Phonetilicious*

Dartmouth, NH, 2013

PayPal Hack2Launch, **1<sup>st</sup> place** for *Blastema*

Boston, MA, 2013

HackPrinceton, **“Coolest Hack” award** for *kclusterafromb.py*

Princeton, NJ, 2013

Rethink Music Hackathon, **LyricFind prize** for *Lyrical Sonnet Awesome*

Boston, MA, 2012

New England College Hackathon, **4<sup>th</sup> place** for *Third-person Perspective Augmented Reality*

Boston, MA, 2011

Northeast National Collegiate Cyber-Defense Competition, **2<sup>nd</sup> place**

Rochester, NY, 2008

## RELEVANT PROJECTS

<i>Pizzafire</i>	Created a multithreaded job queue for distributed neural network tasks. Automates the deployment of many AWS EC2 g2.2xlarge instances. Terminates appropriately to minimize cost. Executes commands and monitors activity over ssh. I use this to apply <i>A Neural Algorithm of Artistic Style</i> (Gatys, Ecker & Bethge, 2015) to video and very large images. <i>Python</i>	2016
<i>Semantigram</i>	Created a tool for navigating hours of video lectures by visualizing topic-change over time. Uses video transcripts, segments text using a moving window with variable hop size, performs LDA, then sorts topics by earliest maximum relevancy. <i>Python</i>	2015
<i>Extreme Time Stretch</i>	Created an algorithm for stretching audio over 5000%. Uses a transient-sensitive approach to phase vocoder resynthesis. Makes better quality stretches than the time stretch used in most audio software. <i>Python</i>	2015
<i>EEG Neurofeedback</i>	Created algorithm for analyzing EEG signal and providing audio feedback to train practitioners of meditation. Built in collaboration with researchers from the Transformative Technology Lab at Sophia University in Palo Alto. <i>Max/MSP</i>	2015
<i>Percussion Isolation</i>	Created an algorithm for isolating percussion from a song. Initializes non-negative matrix factorization with the vertical components from spectral median filtering, which isolates percussion better than median filtering alone. <i>Python</i>	2014
<i>Timbre Spectrum</i>	Created an algorithm and UI for colorizing musical timbre. Reduces high-dimensional timbre vectors to hue. Uses flattened hierarchical clustering, because PCA does not preserve local clusters, and Traveling Salesman is too expensive. <i>Javascript</i>	2014
<i>Crowd Remix</i>	Created a tool for collaborative music production. Uses <i>Timbre Spectrum</i> , euclidean rhythms, and concatenative synthesis. User builds song parts by exploring the space of possible permutations which improves the efficiency of production. <i>Javascript</i>	2014
<i>Phoneticicious</i>	Created an algorithm for improving the alliterative quality of text while preserving meaning; used to generate a 50,000+ word novel for <i>NaNoGenMo 2014</i> . <i>Python, NLTK</i>	2013
<i>kclusterfromb.py</i>	Created an algorithm for building one song out of segments of another. Improves upon an earlier nearest-neighbor approach by using a k-means cluster-pairing method for segment replacement which helps preserve the range of timbre. <i>Python</i>	2013
<i>Dadabots</i>	Created bots that spider Soundcloud for tracks, remix their music/artwork/title, post, comment, and gain followers. <i>Python</i>	2012
<i>Anaphone Solver</i>	Created an algorithm, web tool, and SMS API for solving phonetic anagrams ( <i>galaxy : lucky gas</i> ). <i>Python, NLTK, Twilio API</i>	2012
<i>Lyrical Sonnet Awesome</i>	Created a sonnet generator whose words are derived from a song lyrics dataset. Featured in Forbes. <i>PHP</i>	2012
<i>Chaos Notes</i>	Created a productivity tool for efficient note-taking. Notes were used as a dataset for a chatbot (based on MegaHAL) which generated new content occasionally inspiring the user to think of new ideas. <i>Javascript, PHP</i>	2010

## TALKS

New England Region of the American Music Therapy Association Conference, “ <i>Music Therapy Technology</i> ”	Whitefield, NH, 2015
Boston Music Technology Group, “ <i>Dadabots: Socially-Automated Dadaist Music Remix Bots</i> ”	Boston, MA, 2013
Northeastern ACM Speaker Series, “ <i>Computational Creativity: Forming a cult of personality around an artificial artist</i> ”	Boston, MA, 2013

## HACKATHON ORGANIZER

SoundBomb Arts Hackathon	Cleveland, OH, 2015
MusicTechFest Scandi += Boston Telehackathon	Boston, MA, 2015
MusicTechFest Paris += Boston Telehackathon	Boston, MA, 2014
MusicTechFest Berlin += Boston Telehackathon	Boston, MA, 2014
Berklee Music Therapy Hackathon	Boston, MA, 2014

## OTHER INTERESTS

Music remix competitions
Tuvan throat singing
Parkour
Frontman/singer for a metal band
Solving Rubik's cubes while holding my breath