

Payne Y. Chang

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Software Engineer with Expertise in Instrument Control and Image Processing

Software engineer and neurobiologist with skills and experience in designing, coding, testing, and implementing applications for instrument control and data acquisition. Expertise in processing, analysis, and visualization of imaging data and electrical signals.

Key Skills

Programming Languages and Web Technologies

C, C++, C#, Java, Python, HTML, CSS

Programming Techniques

Image Processing and Analysis, Digital Signal Processing, Numerical Methods, Algorithm Design

Computer Graphics, Computer Vision, GUI Design

OpenGL, FLTK, Cocoa Framework, Video Processing and Analysis

Operating Systems

Microsoft Windows, Mac OS

Integrated Development Environments

Microsoft Visual Studio, Apple Xcode

Computer Simulation and Analysis Environments

NEURON

Electrophysiology

Whole-cell Patch Clamp Recording, Field Potential Recording, Electrical Data Processing and Analysis

Computer and Camera Interfaces

Microstar Laboratories DAP 3200e/214 & 5400a, HEKA ITC-18, EDT PCI DV C-Link

Instruments

Axon Patch-clamp Amplifier, Dagan Patch-clamp Amplifier, RedShirtImaging CCD-SMQ Camera, Allied Vision Technologies GE680

Imaging, Optics, Microscopy

Voltage-sensitive Dye Imaging, Calcium-sensitive Dye Imaging, Differential Interference Contrast Optics, Fluorescence Microscopy, Imaging Data Processing and Analysis

Experience

Software Engineer

2012/09 - Present

Nemetschek Vectorworks, Columbia, Maryland

- Carbon framework to Cocoa framework conversion.
- Software resource conversion and management.
- Software localization.

Postdoctoral Fellow

2006/09 - 2012/08

University of Texas at Austin, Austin, Texas

- Designed, coded, tested, and documented Ephyx (an application written in C/C++) for simultaneous control of patch-clamp amplifier and high-speed CCD camera. Developed versatile experimental control over sophisticated experiments.
Webpage at <http://paynesnotebook.net/Research/C++/Ephyx/>
- Devised computer vision algorithms and developed programs to analyze animal behavior videos.
Webpage at <http://paynesnotebook.net/Research/C++/BehaviorAnalysis/>
- Designed and performed calcium-sensitive dye imaging and voltage-sensitive dye imaging.
- Designed and performed whole-cell patch clamp recording and field potential recording experiments.
- Used NEURON, Python, and Matlab to model, simulate and analyze neuronal activities.

Postdoctoral Fellow

2006/05 - 2006/08

University of Wisconsin-Madison, Madison, Wisconsin

- Designed and developed PhotoZ (an application written in C/C++) for simultaneous control of Axon patch-clamp amplifier and a photo-diode array system. Designed electronic circuit and modified the photo-diode array system to automate gain control of post-amplifiers.
Webpage at <http://paynesnotebook.net/Research/C++/PhotoZ/>
- Developed AmpZ to analyze amperometry data recorded by Axon pClamp program.
Webpage at <http://paynesnotebook.net/Research/C++/AmpZ/>
- Designed and performed voltage-sensitive dye imaging and field potential recording experiments.

Graduate Research Assistant

2000/06 - 2006/05

Education

PhD in Biophysics

2000/06 - 2006/05

University of Wisconsin-Madison, Madison, Wisconsin

- Thesis: Heterogeneous spatial patterns of long-term potentiation in hippocampal slices

MS in Life Science

1996/09 - 1998/06

National Tsing Hua University, Hsinchu, Taiwan

- Thesis: The interaction between glycosaminoglycan and snake toxin as studied by computer simulation and microscopic technology

BS in Electrical Engineering

1992/10 - 1996/06

National Tsing Hua University, Hsinchu, Taiwan

- Senior project: Xdraw - a color image processing and analysis program with a graphical user interface (developed with C language on X Window System, Sun SPARCstation 20)