

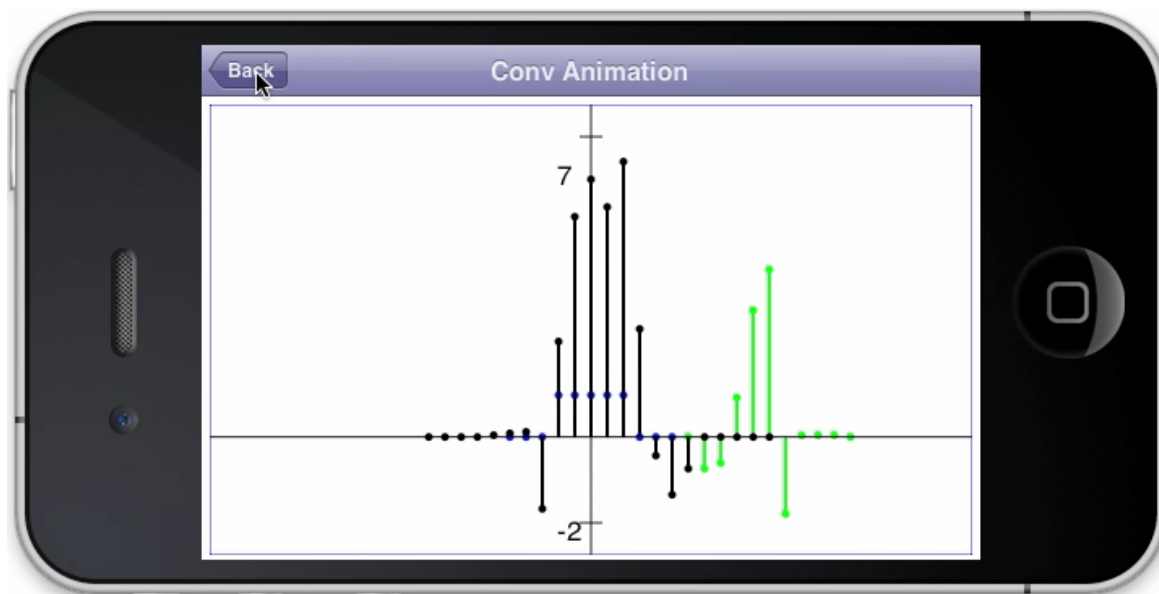
*NSF J-DSP Workshop  
University of Cyprus  
July 18, 2013*



JDSP



# iJDSP: A Mobile Signal Analysis App for iOS Smartphones and Tablets



*Student Programmers: Jinru Liu and Shuang Hu*

*Student Support Team: Jayaraman Thiagarajan, Karthikeyan Ramamurthy, Deepta Rajan, Sophia (xue) Zhang, Girish Kalyanasundaram, Mahesh Banavar, and Suhas Ranganath*

*Presented by: Andreas Spanias*



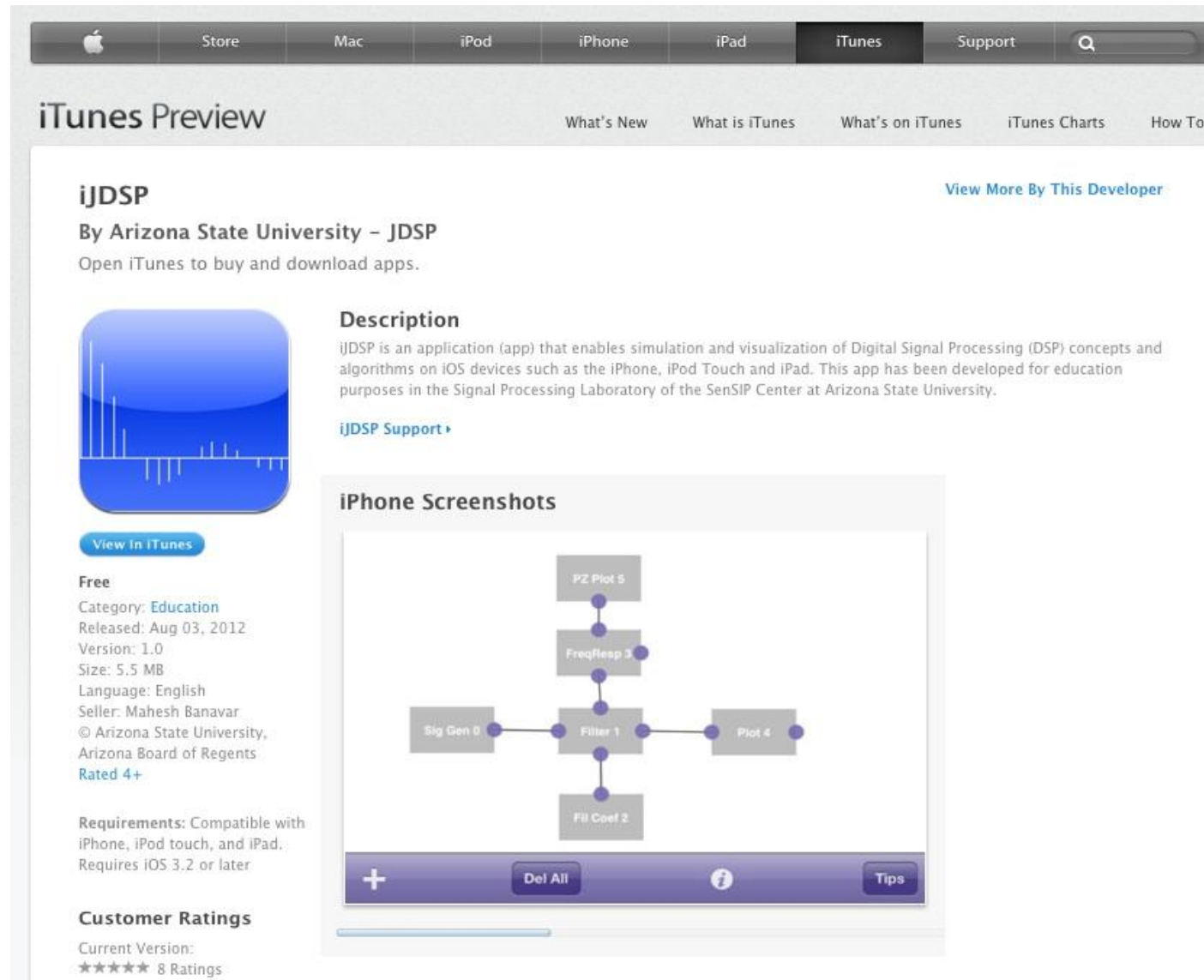
*NSF Program CCLI (TUES) Phase 3 Award 0817596 Aug. 2008 – Apr. 2013*

# Video Clip



**iJDSP app**

# iJDSP Free Download on iTunes




The screenshot shows the iTunes Store interface for the iJDSP app. At the top, there is a navigation bar with links for Store, Mac, iPod, iPhone, iPad, iTunes, and Support. Below this is the 'iTunes Preview' section for the app. The app is titled 'iJDSP' and is developed by 'Arizona State University - JDSP'. A 'View More By This Developer' link is present. The app's icon is a blue square with a white waveform. A 'View in iTunes' button is located below the icon. The app is listed as 'Free' and is categorized under 'Education'. It was released on August 03, 2012, and has a version of 1.0. The app size is 5.5 MB and it is in English. The seller is Mahesh Banavar, and it is published by Arizona State University, Arizona Board of Regents. The app is rated 4+. The requirements section states it is compatible with iPhone, iPod touch, and iPad, and requires iOS 3.2 or later. The customer ratings section shows 8 ratings for the current version. To the right of the app information is a 'Description' section. It states that iJDSP is an application that enables simulation and visualization of Digital Signal Processing (DSP) concepts and algorithms on iOS devices. It was developed for education purposes in the Signal Processing Laboratory of the SenSIP Center at Arizona State University. Below the description is a link for 'iJDSP Support'. Further down is a section for 'iPhone Screenshots' which displays a block diagram of a signal processing system. The diagram shows a signal flow from 'Sig Gen 0' through 'Filter 1' to 'Plot 4'. From 'Filter 1', the signal also branches to 'PZ Plot 5' and 'Filt Coef 2'. From 'Filt Coef 2', the signal goes to 'FreqResp 3'. The bottom of the screenshot shows a control bar with a plus sign, a 'Del All' button, an information icon, and a 'Tips' button.

**iJDSP** [View More By This Developer](#)

By **Arizona State University - JDSP**

Open iTunes to buy and download apps.



[View in iTunes](#)

**Free**

Category: [Education](#)

Released: Aug 03, 2012

Version: 1.0

Size: 5.5 MB

Language: English

Seller: Mahesh Banavar

© Arizona State University, Arizona Board of Regents

**Rated 4+**

**Requirements:** Compatible with iPhone, iPod touch, and iPad. Requires iOS 3.2 or later

**Customer Ratings**

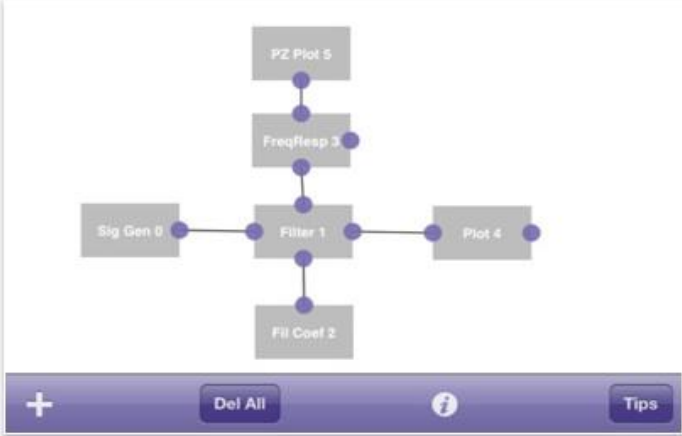
Current Version: ★★★★★ 8 Ratings

**Description**

iJDSP is an application (app) that enables simulation and visualization of Digital Signal Processing (DSP) concepts and algorithms on iOS devices such as the iPhone, iPod Touch and iPad. This app has been developed for education purposes in the Signal Processing Laboratory of the SenSIP Center at Arizona State University.

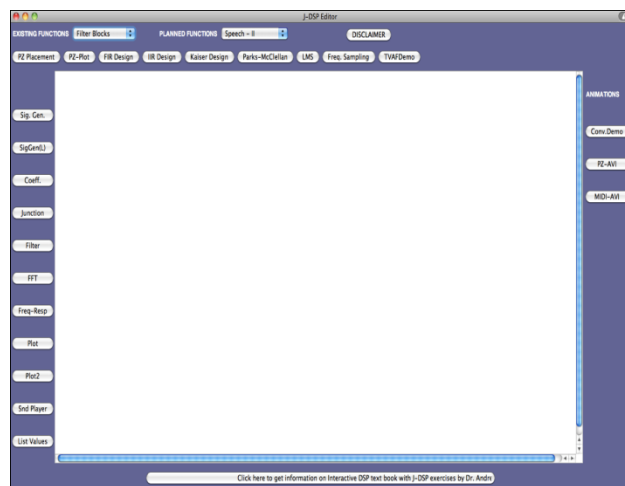
[iJDSP Support](#)

**iPhone Screenshots**

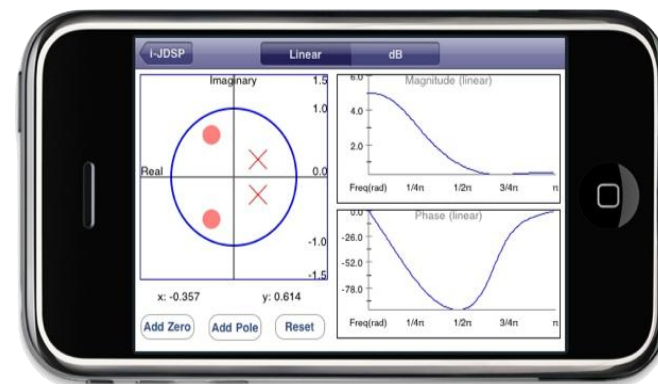
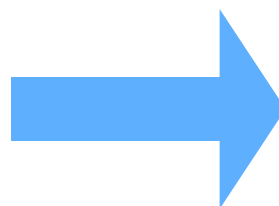


The screenshot shows a block diagram of a signal processing system. The diagram consists of several interconnected blocks: 'Sig Gen 0' (Signal Generator 0) on the left, 'Filter 1' in the center, and 'Plot 4' on the right. Above 'Filter 1' is 'PZ Plot 5' (Pole-Zero Plot 5), and below it is 'Filt Coef 2' (Filter Coefficients 2). To the right of 'Filter 1' is 'FreqResp 3' (Frequency Response 3). The blocks are connected by lines representing signal flow. At the bottom of the screenshot, there is a control bar with a plus sign (+), a 'Del All' button, an information icon (i), and a 'Tips' button.

# From Java-DSP (J-DSP) to iJDSP



J-DSP



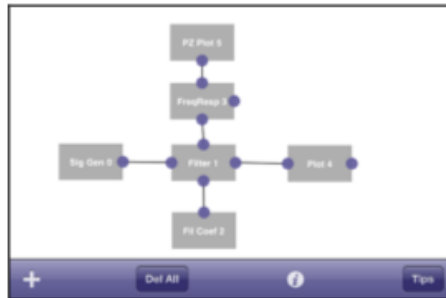
iJDSP

# *i*-JDSP for Simulation, Visualization, Dashboards, Outreach

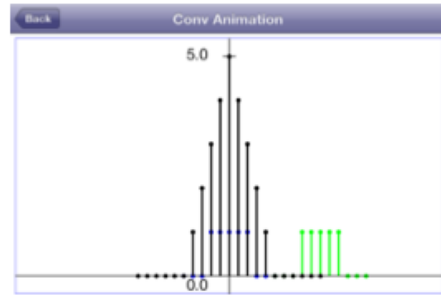
*Available for DSP and Signals and Systems*

*Can be adapted for other STEM areas*

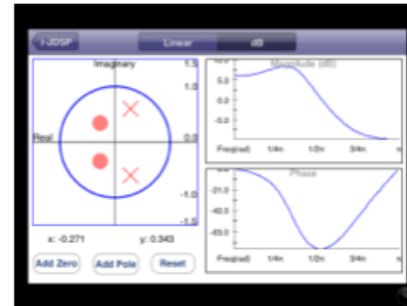
*Used in other disciplines*



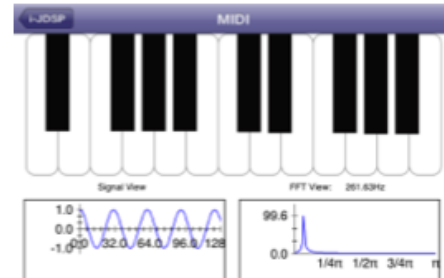
**Simulator/Calculator**



**Lab/Visualization**

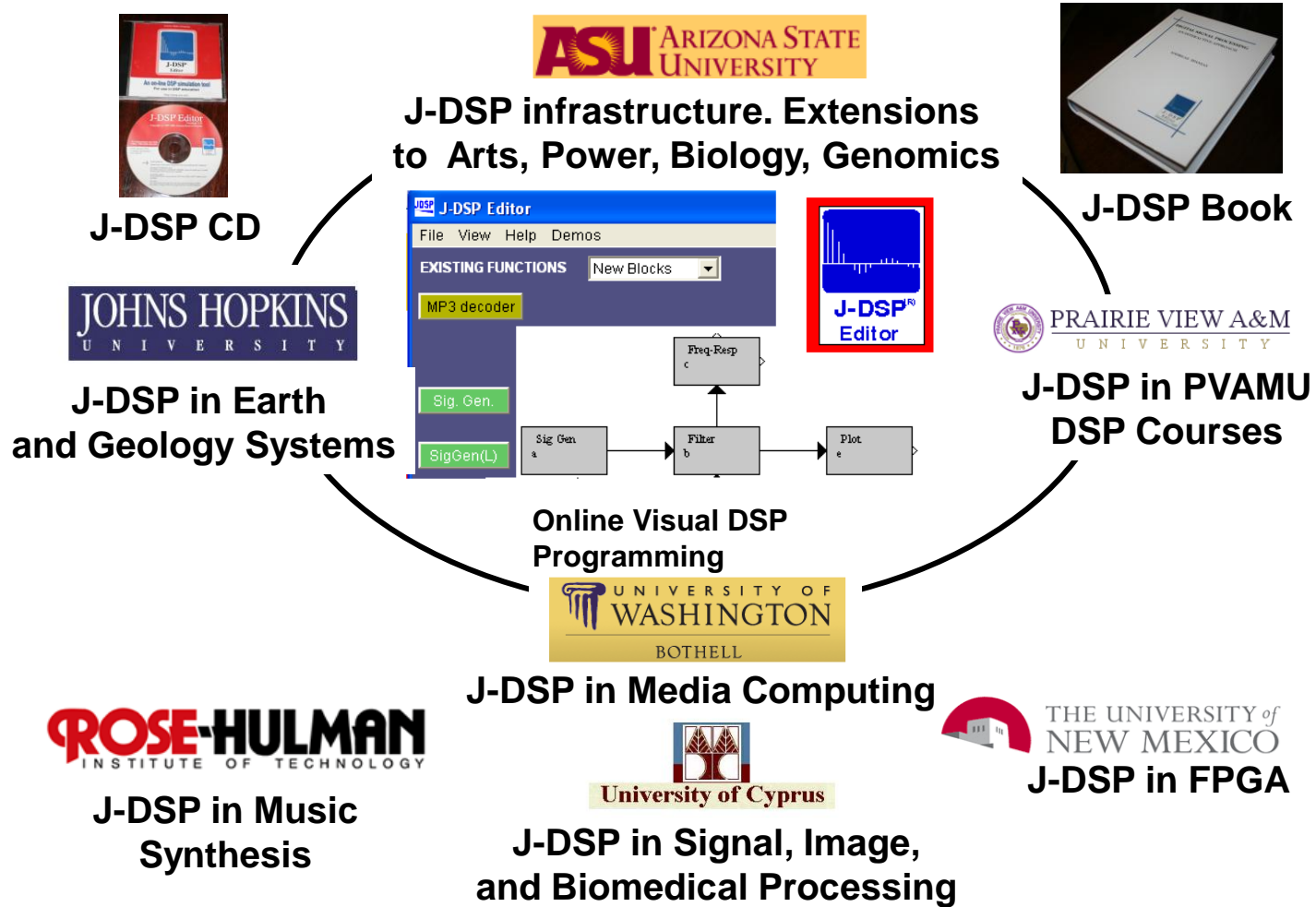


**Dashboard**

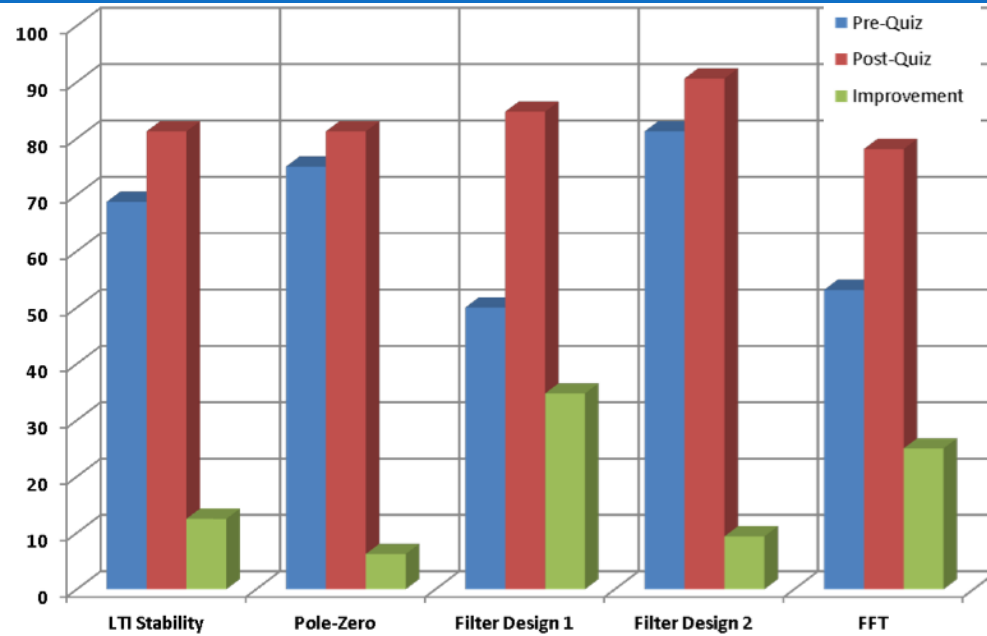


**Outreach**

# 5 year Collaborative NSF Phase 3 TUES (CCLI) Project



# Labs and Assessment



## *Labs and Assessment*



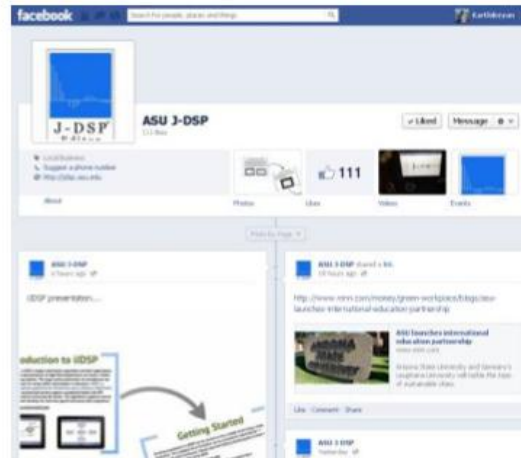


# Internet II and Mobile Support Tools for iJDSP

**Bb** Mobile Learn



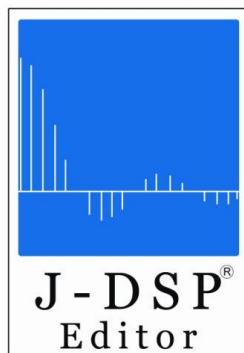
- Course Info
- Course Quiz
- Course Demo
- Course Video
- Course Lab
- Course Grade
- Course Assessment



<http://jdsp.asu.edu>



# Dissemination



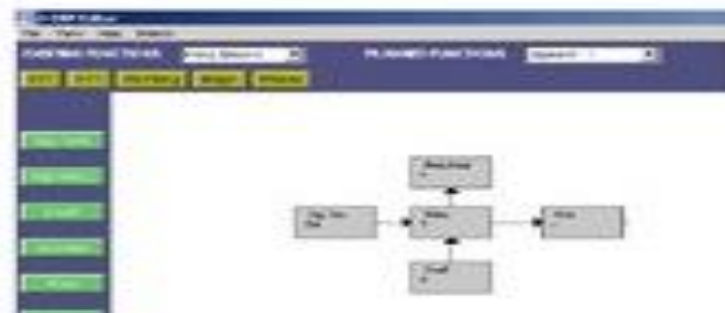
## Universities that have materials include:

Georgia Tech  
University of Southern California  
University of Maryland  
University of Minnesota  
University of New Mexico  
University of Texas-Austin  
University of Texas-Dallas  
University of Central Florida  
Northeastern University  
University of Kent  
Marquette University  
Stevens Institute of Technology  
Georgia Institute of Technology  
Johns Hopkins University

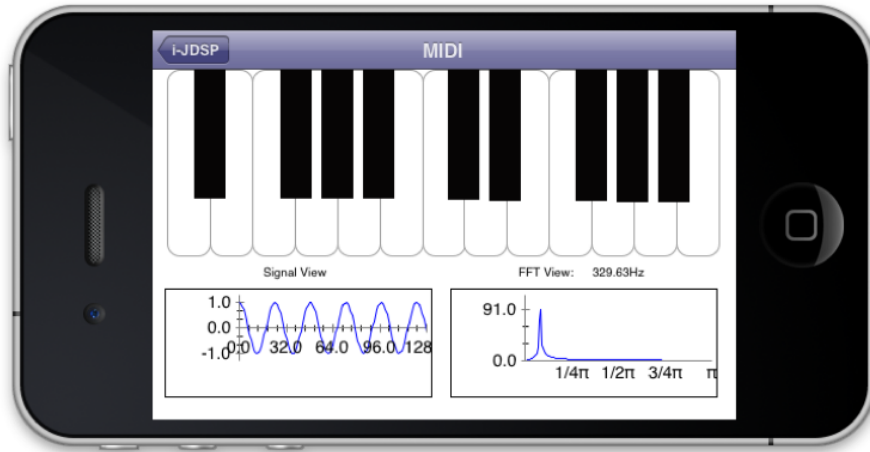
Blekinge Institute of Technology  
Drexel University  
University of Nebraska  
Cal Poly Pomona  
University of Detroit-Mercy  
University of Pennsylvania  
Prairie View A&M University  
Rice University  
Massachusetts Institute of Technology  
University of Akron  
University of Connecticut  
University of Puerto Rico  
Clemson University  
North Carolina State University

**MITOPENCOURSEWARE**  
MASSACHUSETTS INSTITUTE OF TECHNOLOGY  
Object ID: 33452

Business School Overview



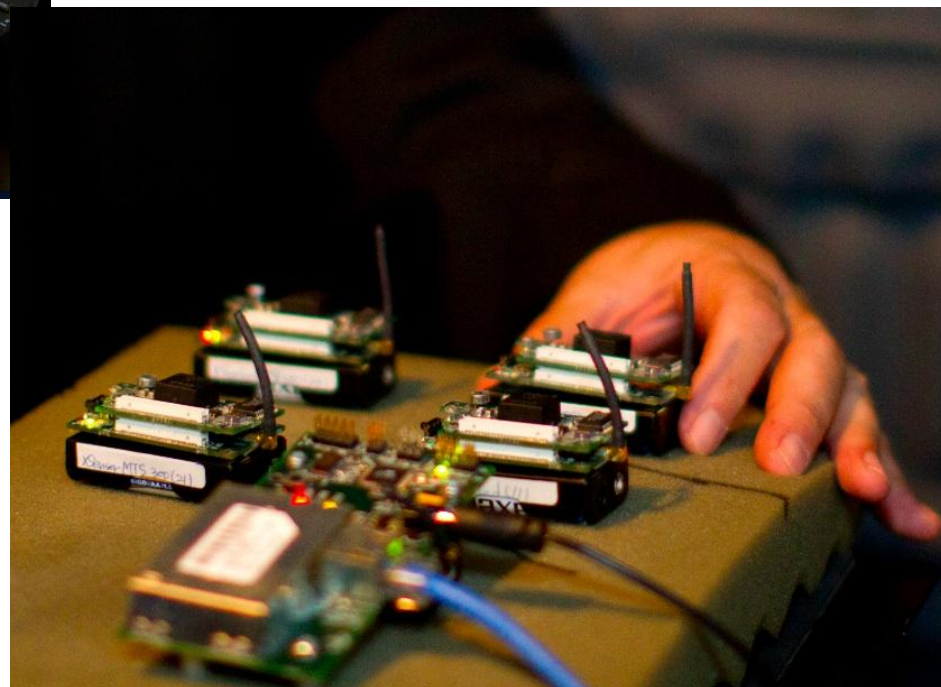
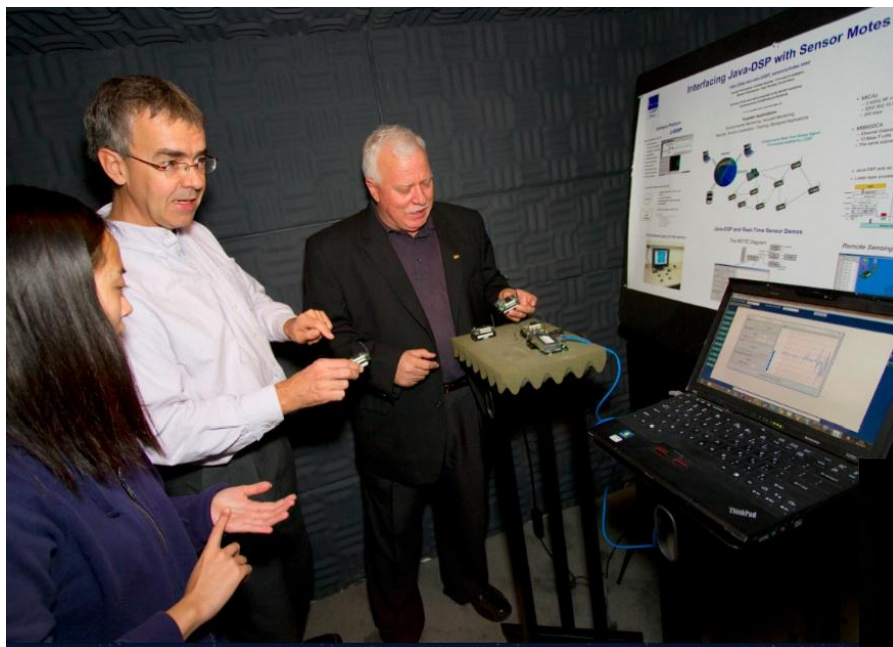
# iJDSP and Outreach



**MIDI View**



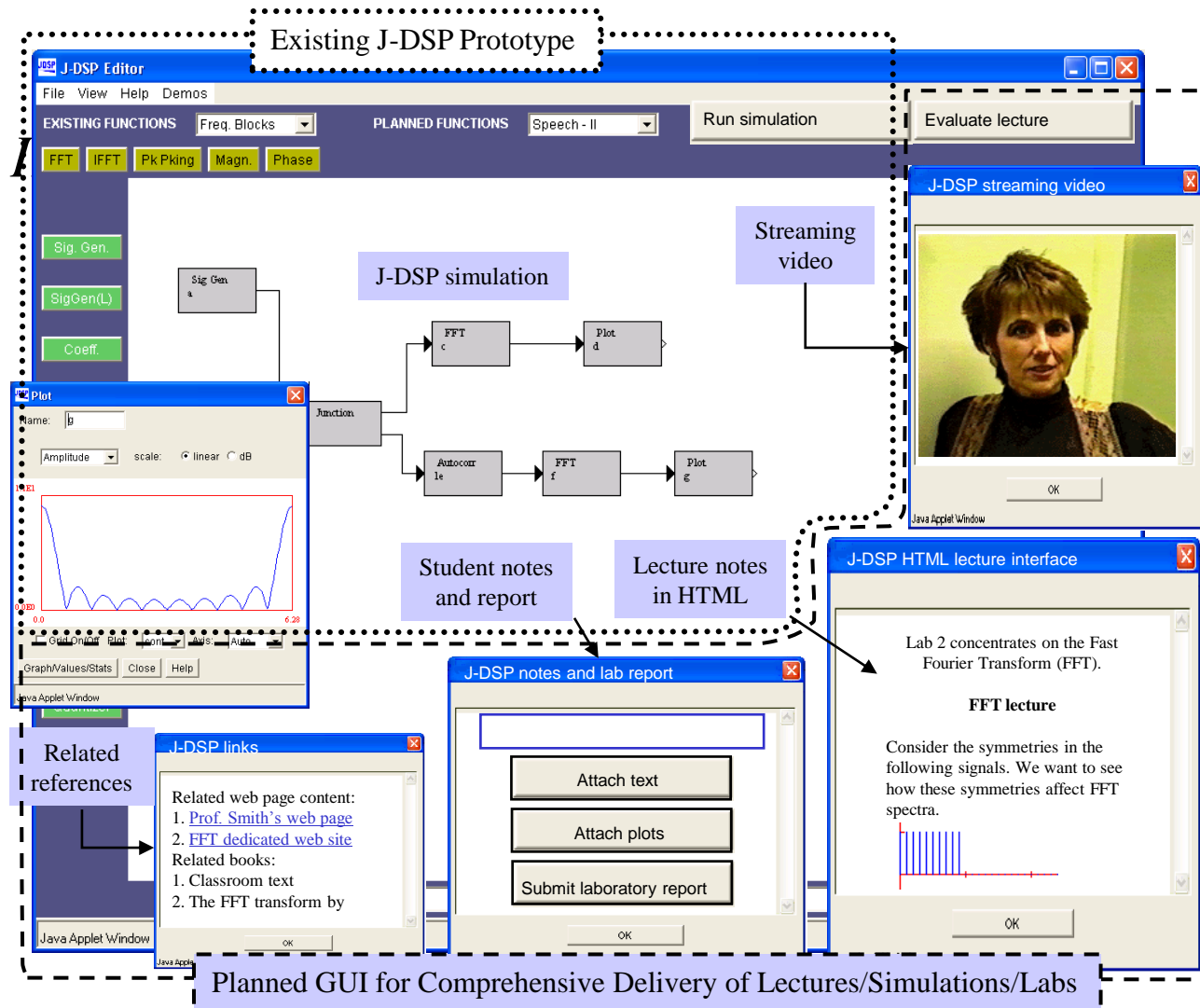
# iJDSP and Sensor Network Research



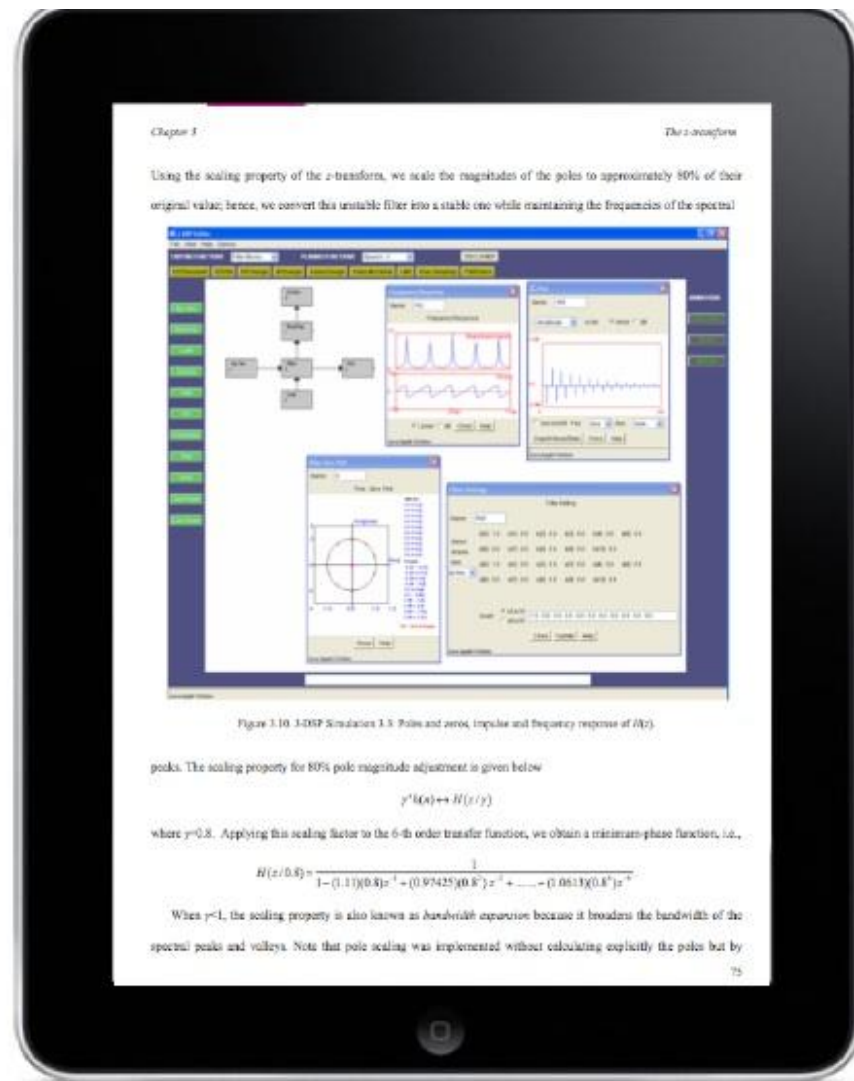
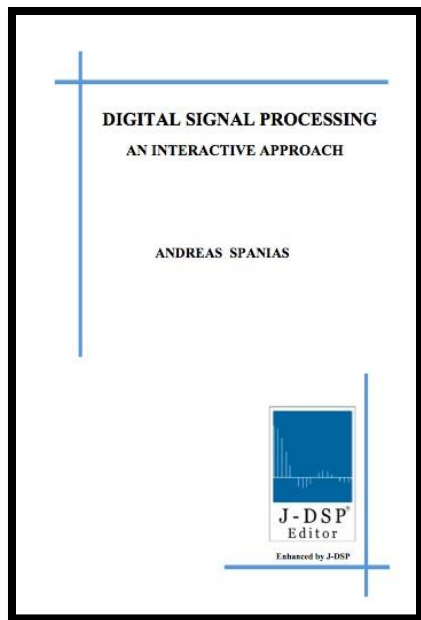
# Next Steps

- *Interactive e-Learning and e-book*
- *Extensions to other Disciplines*
- *Collaboration with Industry and other Universities*
- *Android App*

# e-Learning



# Embed in e-Books



# Synergies with Companies and Tools

## Interfaces to MATLAB, LabVIEW and TI DSP Hardware

### THREE SIMPLE STEPS

1. Prepare J-DSP Simulation
2. Export simulation in MATLAB or Math script.
3. Copy and paste into MATLAB editor window.

The screenshot shows the J-DSP Editor interface. On the left, there is a vertical toolbar with buttons for 'Sig Gen', 'SigGen(L)', 'Coeff', 'Junction', 'Filter', 'Freq Resp', 'Plot', 'Plot2', 'Snd Player', and 'Quantizer'. The main workspace contains a signal flow graph with blocks for 'Sig Gen', 'Filter', and 'Plot'. A dialog box titled 'Export' is open, showing the 'Export' tab with the following text:

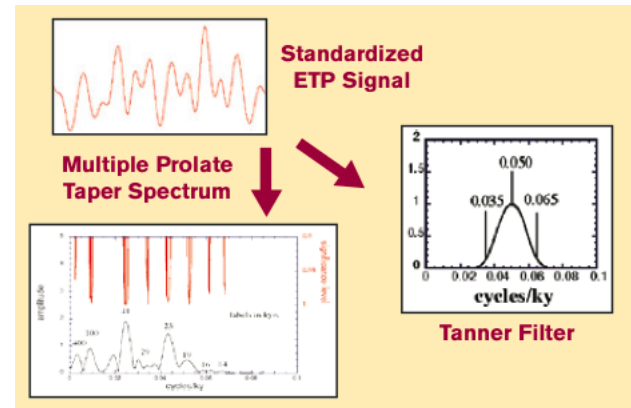
```
Copy and paste this code:  
clear all; close all;  
% MATLAB code generated by J-DSP Editor  
VAR1 =  
VAR2 =  
% Filter (f,6)  
NUM6 = [1.0,2.0,-1.0,0.0]  
DEN6 = [1.0,1.0,0.0,1.0]  
VAR6 = filter(NUM6,DEN6,VAR4);  
figure(6), freqz(NUM6,DEN6)  
  
% Plot (b,2)  
figure(2), plot(VAR2)  
% Plot (h,8)  
figure(8), plot(VAR6)
```

A callout bubble with a jagged border points to the 'Export' dialog box and contains the text: 'Functionality being developed in J-DSP'. Three numbered circles (1, 2, 3) are placed above the screenshot, with arrows pointing to the 'Export' dialog, the MATLAB editor window, and the MATLAB editor window respectively.



# App in Other Disciplines

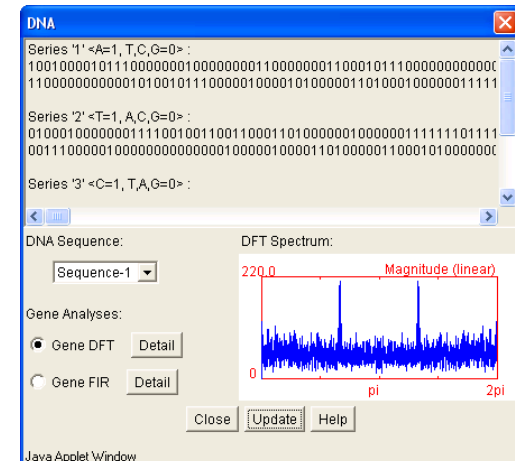
## ◆ Earth Systems and Geology



## ◆ Sustainability



## ◆ DNA and Genomics



# *Android Version to be Released Soon*

- Beta Version Tested
- Workshop in November for assessment
- Java functions port 90% but graphics do not.
- To be released on Android App store Feb 2013.



# Acknowledgements

- National Science Foundation  
Sponsored in part by NSF Program  
TUES (CCLI) Phase 3 Award 0817596
- SenSIP Center  
School of ECEE, IAFSE, ASU
- Sprint Communications  
Provided iPhone devices for testing
- The Premier Award Panel for recognizing the app
- Microsoft, Wiley, TechSmith for sponsoring the award



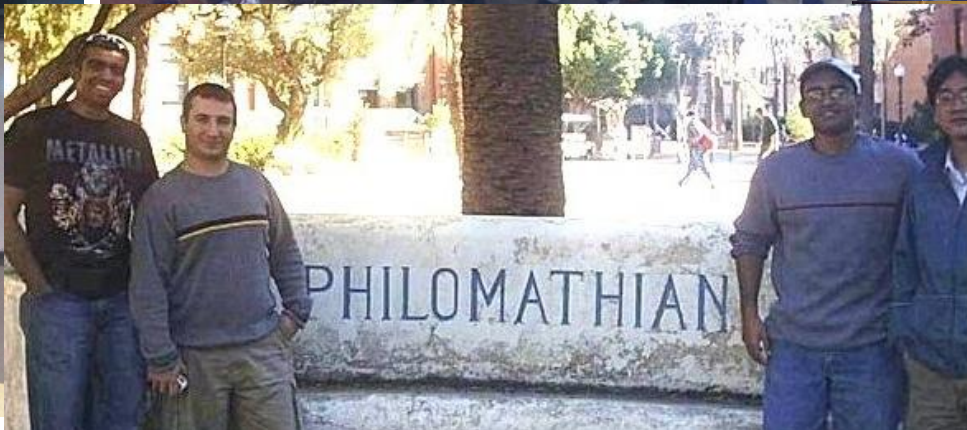
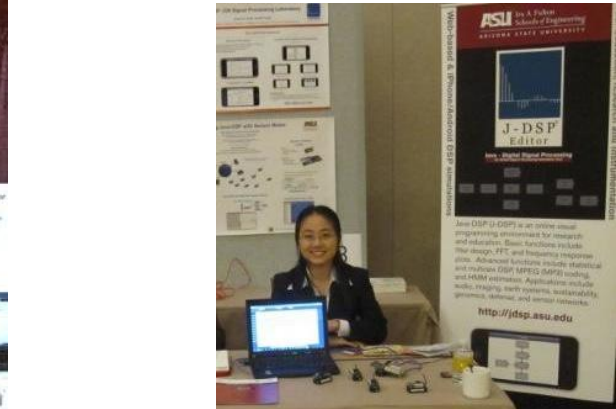
**PREMIERAWARD**  
*for Excellence in Engineering Education Courseware*



# More Info and Demos at the FIE 2012 Exhibit



# J-DSP Student Software Development Team through the Years



<http://jdsp.asu.edu>



# Contact

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(480) 965 1837  
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