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# **Dynamic Spectrum Allocation for Low-Bandwidth Power Line Communications**

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# Personal Background

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- Texas State University Research Assistant under guidance of Dr. Stan McClellan
  - Work done as a part of a larger research movement in Smart Grid applications
  - Now employed at Southwest Research Institute as an Engineer
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# Project Background

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- Transmitter designed by another group
  - Will not focus on method of injection, only analysis used to choose potential carriers
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# Design Parameters

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- Primary user characteristics well known and regulated
  - Transformer as a filter
  - Sources of noise
    - Correlated noise
    - Broadband noise
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# Algorithmic Considerations

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- Analysis using mean and variance of potential transmit channel, in frequency domain. **Mean-based Spectral Moment Algorithm (MSMA)**
  - Complexity concerns - targeted for embedded devices. Peak finding is easy for humans, hard for computers.
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# Demo

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- Developed in python, on Ubuntu 12.04.
  - Compiled to executable using python(x,y) and cxfreeze in Windows XP.
  - Available on github - <http://www.github.com/kastnerkyle/AlgorithmGUI>
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# Relation to Cognitive Radio

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- Problem constraints similar to OFDM where sub-carrier spacing much larger than potential transmit bandwidth
  - Can think of transformer envelope as channel fading, except no need for constant equalization. Transformer characteristics relatively static.
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# Conclusion

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- Acknowledgements and Questions
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