WIRELESS COMMUNICATIONS & SIGNAL PROCESSING LAB

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Research Areas of the Institute of Communications Engineering

通訊系統 (Communication systems)

數位通訊 通訊訊號處理 錯誤更正碼

VLSI通訊

無線通訊/網路 寬頻通訊/網際網路 光纖通訊系統/網路 通訊系統/網路晶片設計 通訊網路理論 無線感測網路

高速網路

多媒體網路

網路管理

通訊網路 (Communication Networks)

5G Wireless Communication System



Cellular Wireless Communication System









Our Research Interests

- Interdisciplinary Research: From wireless communications to biomedical & hyperspectral image processing
 - Lots of high-quality, innovative, cutting-edge research accomplishments.
 - Lots of joint research explorations with international experts and visiting scholars/students.

Wireless Communications: 5G System Design

- Coordinated beamforming designs for multicell networks.
- Robust transmit optimization for heterogeneous networks.
- Energy efficient full-duplex transceiver design.
- Distributed signal processing for Internet of Things (IOT) scenarios.
- Massive MIMO and millimeter wave communications.
- Content-centric secured communications.
- Massive machine type communications (MMTC), ultra reliable, low latency communications (URLLC).



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Biomedical & Hyperspectral Image Processing and Analysis: Big data Analysis and Machine Learning

- Non-negative blind source separation (nBSS) with applications in biomedical imaging and early cancer detection.
- Fusion of different spectral and spatial resolution data.
- Unmixing hyperspectral images for identification of unknown materials.
- Graph signal processing for hyperspectral and biomedical data analysis.

Biomedical & Hyperspectral Image Processing

- Biomedical image analysis
 - nBSS with applications in early cancer detection using DCE-MRI.
 - Detection of non-negative biomedical sources in gene expression data, microarray data, and molecular data.
- Hyperspectral image analysis
 - Unmixing hyperspectral images for robust identification of unknown materials against endmember variability and outliers.
 - Advanced data fusion algorithms for higher spectral and spatial resolution of hyperspectral images.





Experiment of Dual-Energy Chest X-Ray







Observed images composed of soft-tissue image and bone image

Experiment of Dual-Energy Chest X-Ray







Separated images

Summary of Our Group

■ 人員 博士生4名、碩士生6名、專任行政助理1名

- ■研究成果 國際最頂級的期刊及會議論文220篇(請參閱實驗室網頁)
- 👹 榮譽事蹟 2005、2006、2009年榮獲電音院優秀學生獎學金 2005年度榮獲 ICICS-2005 學生論文獎 2006年榮獲財團法人傑出人才基金會優秀學生出國開會補助 2006年榮獲教育部 菁英留學獎學金 2007年榮獲國科會千里馬專案留學補助 2009年榮獲國科會中技社科技研究獎學金 2009、2010年榮獲清華傑出獎學金 2009年榮獲潘文淵先生獎學金 2010年瑩獲CID&ORSTW博十論文優勝 2010年榮獲IPPR博士論文佳作 2011年榮獲IEEE WHISPERS最佳論文獎 2012年榮獲MIIS Best Poster Award 2013年榮獲國科會千里馬專案留學補助 2016年榮獲IPPR博士論文佳作 2016年榮獲IEEE/GRS-S最佳博士論文 Desktop PC、伺服器主機、LCD 帶幕、雷射印表機、 💐 設備 Notebook、不斷電系統

Funded Research Projects

- Current Research Projects Sponsored by Ministry of Science and Technology (Principal Investigator: Prof. Chong-YungChi)
 - Advanced Convex Optimization Theory based Blind Source Separation for Biomedical and Hyperspectral Image Analysis and Applications (08/01/2015~07/31/2018)
 - Advanced Robust Multicell Coordinated Transmission for Interference Management under Imperfect Channel State Information (08/01/2016~07/31/2018)



If you are interested in any of the above researches and related mathematics, and wish successful research exploration, you are welcome to join us.

請儘早(大三下學期即可)與本人聯繫,並備妥以下資料的電子檔(WORD/PDF)(第1、2 項為必繳之資料,第3項為選繳之資料):

- 1. 大學歷年成績單(包括名次)
- 自傳及研究計畫(包括家庭背景、研究興趣、未來研究方向、求學過程,儘可能三頁 以內,請註明聯絡方式)

3. 英文能力證書(托福成績或全民英檢)

經過與本人的溝通(包括E-mail及面談)後,若獲得本人同意,將優先推薦您經由甄試進 入本所碩士班就讀,而且您將比同儕擁有下列優勢:

 無須再為進研究所考試而補習,將可專注於大四的專業課程,為日後研究紮下根基。
若能於大四上學期(共七學期)提前完成學士學位者,將可於春季班註冊成為通訊所研究生,以及早獲得本人的指導及一些研究資源(如研究室空間、設備、津貼及其他軟硬體的使用權等),甚至可比同儕早一年完成碩士學位。表現優異者,一年後可直升 博士班。



If you want to join us, please contact us via



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Or refer to our webpage

http://www.ee.nthu.edu.tw/cychi/

