A Brief introduction for School of Life Science and Technology (SLST)
Contents

- History and Scale of SLST
- Mission, Vision and Goals of SLST
- Statistics and Achievements of SLST
- Action Plans
- New Project
- Summary
Building for Life Science

SLST
2001 established

ShaHe Campus (1956-)

787/1412 Py
Academic Statistics

SLST of UESTC

- Faculty: 60
- Enrollment: BS 152/MS 92/Ph.D 18 (2010)
- Graduates: BS 149/MS 81/Ph.D 17 (2010)
- Research Fund: 10 million (RMB) (2010)
Organization of SLST

SLST

Academic (degree) Committee
Professors Committee
Dean

Biomedical Engineering Department (BME: Li)

BioTechnology Department (BT:Huang)

NeuroInformation Key Lab of MOE (Yao)

administrative management
executive management (Yuan)
Education (Liu)
Student (Zhang)
Research & Industry relation (Li)
• Ultrasonic Medical Instruments
• Medical information system
• Cardiac information mimics
• Bioelectromagnetic effect
• Biomechanics
• Nano-biomaterials
• Bio-Electronics
• Medical Image Processing
• …..
BioTechnology Department

- Molecular Biology and Plant genetic seeding
- Protein Engineering
- Potato and bioenergy
- Bioinformatics
- Molecular neurobiology
- Molecular endocrinology
- neuroimmunology
NeuroInformation, Key Lab of MOE

- EEG and Brain-computer interface
- Brain Imaging (MRI/DTI/fMRI,..)
- Neural coding
- Brain Connectome
- Visual mechanism and Modelling
- Attention and eye movement
- Music cognition
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Mission Statements (Grad.)

Foster Outstanding Students in BT & BME (M.S & PhD)

with

Creativity
Adaptation
Social Responsibility
Effective Communication
Mission Statements (Undergrad.)

- BT Students with Information Science Knowledge
  - Information Technology Skilled
  - Fundamental BT Knowledge
  - Effective Communication Skill
  - Understand Life With Information theory

To be
Mission Statements (Undergrad.)

BME
Electrical Engineering Students with Biomedical Knowledge

to be

Comprehend human anatomy structure

Fundamental Electrical Engineering Knowledge

Understand Information Process in Life

Effective Communication Skill
Vision Statements

- World-Level SLST
  - possesses world-class faculty and outstanding students
  - provides break-through science and technologies for a better quality of life

- Foster Outstanding BT and BME Students
Goals in 2020

Strengthen the global competitiveness in our area

Neural Engineering

Medical Informatics

Plant Genetics

Bio-energy

Protein engineering

Strengthen the global competitiveness in our area
Goals in 2020

**Faculty**
- 72-120
- Foreign faculty: 10-20%
- Researcher, PostDoc: 60

**Students**
- MS Students: 80 → 200/year
- PhD Students: 30 → 80/year
- Bachelors: 150/year
- Foreign students: 20%

**Funding**
- 10 Millions → 50 millions

**Additional Space**
- 4000 square meters → 15000 square meters

Strengthen the global competitiveness in our area
Publications in 2008~2010

- Publications in 2008:
  - Int. J.: [Value]
  - Int. Conf.: [Value]

- Publications in 2009:
  - Int. J.: [Value]
  - Int. Conf.: [Value]

- Publications in 2010:
  - Int. J.: [Value]
  - Int. Conf.: [Value]
Research Funding (then thousands) in 2008~2010
Achievements

- World first observation of separate codon Usage associated with DNA replication in plasmids (F.B. Guo)
- World first high-starch GM sweet potato using sucrose transport control. (X.L. Zheng)
- World first introduced new alien chromatin from *Dasypyrum breviaristatum*, *Secale africanum*, *Thinopyrum trichoporum* to common wheat. (Z.J.Yang)
- World first cluster models for systematic internal rotation in molecular crystals (X.l. Wang)
- World first the theory of nonlinear quantum mechanics and the mechanism and theory of mechanism of bio-photon emission were proposed (Xiao-feng Pang)
- World successfully the theory of bio-energy transport and the mechanism and theory of biological effect of magnetic-field in life systems were proposed (Xiao-feng Pang)
- World's first systematic investigation of properties of nonclassical receptive field in cat's visual cortex (Y.C.Cai)
- World first freely accessible web tool for mimotope-based epitope mapping (J. Huang)
- World largest mimotope database (J. Huang)
- Scale free music of the brain (Wu)
- L0 norm EEG inverse (Xu Peng)
- Zero-reference for EEG (Yao DZ)
- Non-linear causal network of the brain (Chen HF)
- ......
SLST (Under)  
(Bachelor students admitted)
<table>
<thead>
<tr>
<th>Authors</th>
<th>Title</th>
<th>Journal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Li Shiyong</td>
<td>SAROTUP: Scanner And Reporter Of Target-Unrelated Peptides</td>
<td>Journal of Biomedicine and Biotechnology</td>
</tr>
<tr>
<td>Li Shiyong</td>
<td>MimoDB: a new repository for mimotope data derived from phage display technology</td>
<td>Molecules (Basel, Switzerland)</td>
</tr>
<tr>
<td>Chen Rui</td>
<td>Effects of redox state of disulfide bonds on the intrinsic fluorescence and denaturation of Trx-fused Gibberellin-induced cysteine-rich protein from Gymnadnia conopsea</td>
<td>Spectroscopy and spectral analysis</td>
</tr>
<tr>
<td>Chen Rui</td>
<td>Application of polarization fluorescence to study the effect of darkness on the wheat chloroplast</td>
<td>Spectroscopy and spectral analysis</td>
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<tr>
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<td>Studies of intrinsic fluorescence in the process of acid cleavage of Trx-fused g-thionin from Gymnadnia conopsea</td>
<td>Spectroscopy and spectral analysis</td>
</tr>
<tr>
<td>Tong Hao</td>
<td>Automatic prediction of non-coding RNA genes in prokaryotes based on compositional statistics</td>
<td>Journal of Theoretical Biology</td>
</tr>
<tr>
<td>Zhang Xianliang</td>
<td>Prediction of subchloroplast locations of proteins using pseudo and composition</td>
<td>Current Proteomics</td>
</tr>
<tr>
<td>Li Shijie</td>
<td>Relationship of Mean Protein Sequence Entropy with Whole Genome ORF Prediction Accuracy for Bacteria Genomes</td>
<td>ICCEE 2010</td>
</tr>
</tbody>
</table>
Students
Admitted & Graduated in 2006~2010 (Master and Ph.D. students)
Posts After Graduation

B.S. Students [June.2006 - June.2010]

- Graduate: 60%
- Industry: 24%
- Others: 5%

M.S. Students [June.2006 - June.2010]

- Graduate: 60%
- Industry: 57%
- Research: 9%
- Educational Ins.: 2%
- Others: 2%
- Ph.D.: 30%
Industry 18%
Government Agency 1%
Educational Ins. 13%
Others 4%
Research ins. 64%

Ph.D. Students [June.2006-June.2010]
<table>
<thead>
<tr>
<th>Professor</th>
<th>Research aspects</th>
<th>Professor</th>
<th>Research aspects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dezhong Yao</td>
<td>Biomedical Signal Processing (Key Lab, Ministry of Information)</td>
<td>Hong Zhou</td>
<td>Neuro-Endocrine</td>
</tr>
<tr>
<td>Chaoyi Li</td>
<td>Visual Mechanism</td>
<td>Zili You</td>
<td>Neuro-immune</td>
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<tr>
<td>Yongjie Li</td>
<td>Visual Modeling</td>
<td>Zheng Guo</td>
<td>systems biology</td>
</tr>
<tr>
<td>Huafu Chen</td>
<td>NeuroImaging</td>
<td>Jian Huang</td>
<td>Immune Information</td>
</tr>
<tr>
<td>Tianzi Jiang</td>
<td>Computational Medicine (LIAMA-UESTC)</td>
<td>Zujun Yang</td>
<td>plant genetics</td>
</tr>
<tr>
<td>Nini Rao</td>
<td>Cardiac Imaging</td>
<td>Yiyao Liu</td>
<td>Nano-biomaterial</td>
</tr>
<tr>
<td>Ke Li</td>
<td>Medical Information system ((Key lab, Sichuan Province))</td>
<td>Peng Xu</td>
<td>Brain-computer interface</td>
</tr>
<tr>
<td>Xiaofeng Pang</td>
<td>Electromagnetic life effect (Key Lab, Sichuan province)</td>
<td>Fengbiao Guo</td>
<td>Bioinformatics</td>
</tr>
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1. Curriculum for undergraduates

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<tr>
<th>Type of Courses</th>
<th>Credits</th>
<th>Percentage in Total Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Courses Required</td>
<td>63.5</td>
<td>37.2%</td>
</tr>
<tr>
<td>Quality Education</td>
<td>6</td>
<td>3.5%</td>
</tr>
<tr>
<td>Basic course in Discipline</td>
<td>50</td>
<td>30.5%</td>
</tr>
<tr>
<td>Courses in Specialty Key Courses</td>
<td>11</td>
<td>6.5%</td>
</tr>
<tr>
<td>Elective Courses</td>
<td>19</td>
<td>11.1%</td>
</tr>
<tr>
<td>Practice and Training</td>
<td>15</td>
<td>8.9%</td>
</tr>
<tr>
<td>Creative credits</td>
<td>4</td>
<td>2.3%</td>
</tr>
<tr>
<td>Total</td>
<td>168.5</td>
<td>100%</td>
</tr>
</tbody>
</table>
Key courses

- Circuit Analysis, Signals and System, Medical Informatics, Digital Image processing, Bioinformatics, Human Anatomy, Physiology, Computer Science, Analog Circuit
- Bio-electronic Instrumentation
  - Medical Ultrasound Technology, Medical Instruments Principles, Medical Imaging Technologies, Biomedical Signal Processing, EDA Technologies, Medical Instrument Design, chip Theory and Application
- Bio-med-Informatics and Software
- Anatomy Physiology Molecular Biology
Action Plans--Education

Acknowledge structure outline for BioTechnology

Key courses

Biochemistry, Molecular Biology, Genetics, Cell biology,
General Biology, Microbiology,
Fermentation Engineering,
Immunology, Genetic Engineering,
Biotechnological Pharmaceutics,
Bioinformatics, Biophysics,
Structure Biology

Our attentions

Stress Biological Fundament
With knowledge of Information Technology Emphasize Practice and Application

Bioinformatics
Bio-X
....

BioTechnology

Information Technology
Master Degree Requirements

At least 26 credits needed (including 24 course credits)
- Common mandatory (5)
- Major mandatory (12)
- Electives > 7
- Research/Practice (2)

Period: 2.5 or 3 year, not beyond 4 year

Tuition fee: 8000 RMB/year

Scholarship:
- First-class (30%): 8000 RMB/year
- Second-class (30%): 6000 RMB/year
- Third-class (20%): 4000 RMB/year

Beyond 3 three year, no scholarship
Ph.D Degree Requirements

- Average study period
  - 3 years to 6 years (limited)
- Tuition fee: 10000 RMB/year
- Scholarship: about 1700 RMB/month
  (no scholarship for 4th and higher students)

At least 14 credits needed (including 12 course credits)
  - Common mandatory (4)
  - Major mandatory > 4
  - Electives > 6
  - Research/Practice (2)
Research directions (not limited) for Ph.D

Neuroinformation Engineering (EEG, fMRI, BCI)
Medical imaging and processing
Bioelectromagnetics
Bioinformatics and System Biology
Signal transduction and gene expression
Molecular neurobiology
Biomechanics
Nanomedicine
Neuro-Endocrine

....
Action Plan: Faculty

- **Strengthen our areas**
  - NeuroImaging
  - Brain-Computer Interface
  - Plant gentic seeding
  - Nano-biology
  - Bioinformatics

- **Expand new areas**
  - Neuroscience
  - Bio-energy

**World-Leading BT-IT Integration Faculty**

- **Support**
  - (From “fabrication” to “Innovation”)

- **High-risk high-return research**
- **Technology innovation**
- **Original core technology**
- **Research cluster**

**SLST**
- Recruit world-level faculty
- Recruit promising junior faculty
Foreign faculty
- 5% → 20%
- Recruit world-class senior faculty and promising junior faculty

Foreign students
- → 10-20%
- From worldwide (most from Asia area)
- Recruit excellent students

Promoting international activity
- Editorial, Committee, Invited talk, …

Dual degree program

Joint Program
Joint Research Center (LIAMA) (China-French)

Action Plan: Globality
Action Plan: Globality
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From Imaging to Network

1. Brain Connectome

- 3SCO
- EEG-informed SPM
- NESOI
- SPM/ICA
- Bold Network
- Scalp Network (REST)
- Brain Network (spatio-temporal)
- 3T MRI system
(2) Nanomedicine and Cell Biomechanics

- Vascular disease (AS)
- Cancer metastasis

Molecular mechanism

Biomarkers / targets

Nanomedicine/ Nanobiotechnology

Molecular Imaging (diagnosis)

Drug/gene delivery (therapy)

Diagnosis and imaging for diseases

Targeted DDS for diseases
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Education
- Curriculum: Breadth, Depth, and BT-IT cross
- Focus fundamental and ability

Research
- High-risk high-return, Technology innovation
- World-class faculty and foreign students
- International visibility

Action Plan
- Brain connectome
- Nano-biomaterials and Biomechanics
Welcome!
Thank You!