**Optomagnetic Design**

**Goal:**
To achieve a wireless optogenetic system probed through electromagnetic oscillation.

**Design:**
1. Magnetotactic bacteria (AMB-1) are chosen as competent chassis to operate on.
2. Mms13 is chosen as our target protein in optomagnetic design for its rigid binding property with magnetosome and the helix-loop-helix motif.
3. CHAMP Design: CHAMP (Computed Helical Anti-Membrane Protein), the designed peptide sequences, inhibit the light interaction between two helices of transmembrane protein Mms13, so that we can successfully use magnetic force to change the conformation of Mms13 to induce the BFC-based BRET phenomenon.

**Constructs:**
- SynthoPrime provides an automated ONE-STEP primer design service of BioBricks for iGEM.

**NeuroSymbiosis**

**Goal:**
To reduce the immune responses that might occur when we introduce AMB-1 into human brain.

**Design:**
We designed an invasive delivery system based on the expression of minC, inv, and LLO to achieve in vitro symbiosis within glial cell.

** Constructs:**
- Primary mixed glial cell - control
- Primary mixed glial cell - being transfected with AMB-1

**Chassis**

**Goal:**
To provide a one-step primer design tool and sequenced genomes as templates for biological parts.

** Constructs:**
- This program extract near 1,400 bacteria replicas as template
- User-friendly interface with basic parameters to change, including length, Tm and GC content

**Human Practice**

We should get Best Human Practice Advance in 2011!
1. A great competition for synthetic biology was held. And it was the first ever synthetic affair in our hometown, Taipei!
2. A brand-new strategy was introduced! It is called role-playing strategy, and is done by assigning roles to each participant.
3. Multiple individual interviews with prestigious professors are operated for their insight into synthetic field. Thus we deserve the honor of best human practice advance.

**International Collaboration**

We collaborated with Tsinghua University, Tianjin University and UST-Singapore including establishment of growth curves of AMB-1, and characterizing pYMB shuttle vector.