Glossary

- **Abstraction** -- a term borrowed from software engineering to indicate the management of complexity inherent to biological parts and the systems made with them. Abstraction simplifies components by hiding, or "black boxing" information, facilitating their use and re-use
- **Biosafety level** -- precautions and containment rules for safely working with biological agents in laboratory facilities
- **Cloning** -- recombinant DNA molecules inserted into a plasmid or virus "vector." The vector must then be introduced into a host cell without killing it
- **Device** -- an engineered genetic object that produces a human-defined function under specified conditions. Devices are produced by combining one or more standard biological parts
- **DNA Synthesis** -- chemical assembly of nucleotides in a specified order
- **Gel electrophoresis** -- the use of current to draw a polymer (like DNA or proteins) through a sieving matrix, separating the polymers by size. Most often agarose is the matrix used for DNA electrophoresis, and polyacrylamide is the matrix used for proteins
- **iGEM** -- the international Genetically Engineered Machine competition in which teams of undergraduates build living systems from standardized, biological parts
- **Inverter** -- takes an input signal and produces the opposite output signal, e.g., HIGH input produces LOW output and vice versa. An inverter functions like a Boolean NOT
- **Measurement** -- the quantitative assessment of a biological function. Measurements can be made of a part, device or system
- **Open Reading Frame** -- the DNA pattern of triplet sequences that encode a protein
- **Part** -- a nucleic acid-encoded biological function
- **PCR** -- a technique for amplifying DNA of known or unknown sequence. The reactions require only 4 components: DNA to be amplified, oligonucleotide primers to bind sequences flanking the target, dNTPs to polymerize into new DNA chains, and a heat stable polymerase in a buffered solution to carry out the synthesis reaction
- **Plasmid** -- a circular, double-stranded DNA molecule typically containing a

few thousand base pairs that replicates within a cell independently of the chromosomal DNA. Plasmid DNA is easily purified from cells, manipulated using common lab techniques and incorporated into cells

- **Promoter** -- sequence of DNA to which RNA polymerase binds for initiation of transcription
- **Restriction Enzyme** -- an enzyme that recognizes and cleaves a specific DNA sequence
- **Ribosome Binding Site** -- the sequence of RNA to which ribosome binds for initiation of translation
- **Standardization** -- a series of assembly and characterization rules. In time, these standards may allow the reliable physical and functional assembly of genetic parts into devices, and devices into systems
- **Transcription** -- the reaction that converts of DNA-templated information to RNA. This reaction is catalyzed by one of several RNA polymerases
- **Transcriptional Terminator** -- a sequence of DNA that signals the RNA polymerase to cease the synthesis of RNA. Terminator sequences are often inverted repeats in the DNA that fold into stem-loop structures, leading the RNA polymerase to pause and leave the DNA it is transcribing
- **Translation** -- the reaction that converts RNA-templated information to protein. This reaction is catalyzed by ribosomes