1 Definitions

SCU  The smallest complete, controllable and significant unit which contributes to the functionality of the process at the nanoscale.

Size Scale  The average size of the SCU.
Scale: \([0,\infty)\) nm

Dimensions Controlled  The number of dimensions controlled in the manufacturing process.
Scale: 0-3
Example: Ball milling (0 controlled)

Degrees of Freedom  The number of attributes the SCU can control.
Scale: 0 +
Example: Insulation protein can envelop nanoparticles and leave it’s “holder” open or closed on demand.

Assembly Reliability  The reliability of perfect duplication.
Scale: [0,1]
Example: Ball milling (0) and photolithography (1)

Active  Whether the SCU, by any means, causes a change in a separate atom that involves a change or movement of a particle not including an electron, photon or phonon.
Scale: Active/Passive

Macro Infrastructure Size  How closing the SCU’s can be packed or the largest factor when it comes to the size of the infrastructure needed to run the nanotech.
Scale: \([0,\infty)\) nm

Self Replication  Self-explanatory
Scale: Yes/No
2 Other Definitions

**State of the Art**  How close the technology is to being completely commericalable. *Commerciable* is when it can be mass manufactured and profitable.

Scale: 1-4

1. Theory
2. Prototype
3. Manufacturable
4. Commercial

**Use**

- **Tool** a macro scale device that manipulates at a nano level
  
  *Example*: AFM

- **Device** a manufactured nanoscale object
  
  *Example*: CNT

- **Nano tool** a nanoscale device that can function as a tool
  
  *Example*: self-replicating nano machine (theoretical)

**Assembly Method**

- **Bottom-up** Lowest level components made first and combined into higher level components
  
  *Example*: SAMs

- **Top-down** Approach which takes a larger block of material and whittles away what isn’t needed
  
  *Example*: Ball milling

- **Combination** A process which uses both forms of creation
  
  *Example*: Photolithography

**Bio-Integration**  Whether or not the SCU has the ability to interact with naturally occurring or commercial biological materials.

Scale: Yes/No

**Self Replication**  Self-explanatory

**Self Replication**  Self-explanatory
3 Evaluations

3.1 Nano-Technitude
1. Size scale
2. Dimensions controlled
3. Assembly reliability
4. Active

3.2 Danger Metric
1. Active
2. Biological integration
3. Size scale
4. Use

4 Applications
1. Medical diagnosis
2. Optics
3. Increasing mechanical strengths (ex. Light bullet proof vest, stronger textiles, stronger bricks)
4. Sensors (gas detection, gas classification)

5 What is Nanotechnology?
The technology that pertains to the controlled manufacturing or application at the nanoscale.