**Universtiy of Northern iowa**

**Technologies Available for Licensing**

* **Bio-based and Humic foundry binders and industrial polymers (**patents applied for**)**
  + Derived from crop plants
  + Derived from abundant, organic mineral
  + Replace petroleum-based binders
  + Estimated per-pound cost savings >40% over petroleum based
  + Abundant, easily processed raw material sources
  + Clean to use—depending on application, cut volatile organic compounds (VOCs) or other Hazardous Air Pollutants (HAPs) by 50% to 100% (zero emissions) in the casting process
* **“Virtual” technologies for teaching the most efficient techniques for laser aimed spray painting and coating** (Virtual Paint “Accumulation Mode” US Patent 7839461)
* Commercial, industrial, and military applications
* Reduces waste and pollution
* Increases productivity
* Lowers costs and increases profitability
* **Laser-optimized devices for coating and coating-removal applications** (“Laser Touch,” “Laser Paint,” “Laser Blast” US Patent 7839461**)**
* Optical Spray Paint Optimization System & Method (US Patents 5,598,972; 5,5757,498 and others)
* Paint gun incorporating a laser device (US Patents 5,856,625; 5,951,296 and others)
* Spray can targeting and positioning system (US Patent 6,896,192)
* Targeting and positioning system for paint or coating removal (US Patent 7,270,593)

**Variable potential ion guide (**US Patent 6,657,190 B2**) and Multipass reflectron**

* Inherent accuracy 10X to 100X better than current technologies, thereby reducing need for expensive corrective software computer hardware
* Particularly useful for proteomics applications (protein particle characterization and synthesis for pharmaceutical research, genomics, etc.)
* Compact design
* **Mass Spectrometer Miniaturization**
* Patent applied for
* Miniaturization of an array detector as a component of a mass spectrometer allowing for significant reduction in overall spectrometer size
* Allows for increased portability
* **Plant Fiber-based Materials** (US Patent 5,194,461)
* Structural materials from plant fibers and recycled HD polyethylene and recycled LD polyethylene
  + - High strength, moldable, lightweight materials
    - Use readily available, lower cost recycled materials
* **Dilatometer: Cold Box core release agent sensor (CBRAS)**
* Used for the cold box process
* Accurately determines when the release agent needs to be applied
* Removes the judgment necessary by the operator
* Able to discriminate the signals of the initial core removal and end of stroke on the core removal air cylinder
* **Soy Oil Additive for Foundry Mold Release (New Disclosure)**
* Environmentally friendly foundry mold release agent
* **Lignite Coating for Time Release Applications (New Disclosure)**
* Environmentally friendly coating for fertilizer and other products where timed release is desired
* **High Density Hydrogen Storage Material: Intercalation of dichalcogenides for enhanced lubrication**
* For the most part, except for acids, dichalcogenides are chemically inept. Therefore, they could be used in a wide variety of environments (wet, dry, and high pressure applications
  + Could be used as an additive in greases or oils, vacuum or other environments where dry lubricants are necessary, or high pressure applications such as munitions
* Intercalated materials can be used to significantly reduce the coupling between layers of the crystal structure; allowing individual layers to better slide across each other
* Can enhance operation lifetime
* **Bio-Security** (US Patent 7,374,874 B2) (others pending)
* Rapid, phage-based bacterial pathogen detection system
* Patented, host-specific, predatory viruses (bacteriophages) attack only anthrax spores and anthrax bacteria
* Systematized for detection or environmental remediation
* Military, industrial, governmental facility, public health and other applications
* **Certified Native Plant Species**
* Local ecotype certified prairie seeds
  + Opportunity to license regional ecotype certified native Iowa seed
* **Process for manufacturing greases using microwave technology**

**(**Licensed July 2012**)**

* Reduces the oxidation breakdown of vegetable oils by reducing the amount of time it takes to heat the oil
* Uniform type of heating that does not result in hot spots, eliminating the need to stir
* Can improve energy efficiency of the heating process by as much as 50%
* **Classroom Collaboration Using Mobile Devices** (In Development)
* Technology will allow Smartphones and tablets to be used for collaborative learning multi-person response experiences in the classroom
* Will improve performance, reduce costs, and be easier to setup and use
* **UNI-FOLD: An improved computational method (algorithm) for detecting and measuring the similarity between protein sequences**
* Used for detecting and quantifying the similarity between amino acid sequences, aligning amino acid sequences, protein structure modeling, and protein function annotation
* Main strength is its sensitivity and selectivity in recognizing the relationships between remotely related amino acid sequences
* Outperforms all other methods in the Lindahl benchmark for fold recognition sensitivity
* Ranks #1 in the SALIGN benchmark for the alignment accuracy
* **Pseudo Random Number Generator (**New Disclosure**)**
* BLF (Binary Lagged Fibonacci) is a pseudo random number generator that can be implemented as both hardware and software
* First pseudo random number generator without a period
* Direct result of a generator without a period is that the size of the state of the machine increases logarithmically, as numbers are generated
* Algorithm is simple and can be implemented easily with 40 lines of code
* Algorithm is very flexible
* **High Performance Digital Receiver for Ultra Wide Band (UWB) Systems Using Low Resolution Analog-to-Digital Converters (ADCs)**
* UWB radio has been regarded as a promising technology for wireless control area networks applied to vehicles and industrial machines, and for wireless sensor networks applied to home/building automation, energy management, healthcare, and so on
* Novel digital receiver for UWB systems
* Although using high resolution ADCs, this new digital receiver can achieve a comparable performance as digital receivers using high resolution ADCs
* **Micro-laser interferometer (**Contact Angle**) for non-contact, nano-scale measurement of surface tension and viscosity of fluids (US patent 6,563,588) with improvements (**patents applied for**)**
* 40X to 100X more accurate than current goniometry technologies
* Can detect minute changes in viscosity, thereby identifying changes in composition (mixing ratios, presence of contaminants)
* Does not touch the fluid, thereby reduces or eliminates potential for contamination of critical fluids, e.g., pharmaceuticals, solders, etc. by testing apparatus
* Greater inherent accuracy reduces need for complex software to correct readings, thereby reducing size and cost of instruments
* Compact design
* **Ramps and Pathways: A Constructivist Approach to Teaching physical Science – Open Source**
* Improves children’s science achievement through movement of objects along ramps and pathways that leads to knowledge about concepts of forces and motion.
* **Other Applied Research**
* UNI investigators are engaged in the following areas of applied research:
* Education technologies and curriculum for 21st Century skills
* Bioinformatics
* Proteomics
* Bio-based industrial lubricants
* Remote sensitometry and industrial logistics
* Nano materials
* Source reduction and containment of hazardous air pollutants in foundry and manufacturing environments
* Computational grids
* Eye tracking research