


2018-2019 Patents & IP


A. Inventions disclosed:

1. Sankar, J.; Xu, Z.; Yarmolenko, S., "Development of Mg-Based Biodegradable Wires and Use thereof in median sternotomy closure and other bone fixations", NC A&T Ref: EN0109 0518, Reported by Z.Xu
2. RE: 2019-040 Invention Disclosure, ***Self-Expanding Biodegradable Metal Stent***, Mark Schulz, UC, Chenhao Xu, UC, Tarek Helmy, St. Louis University, Vesselin Shanov, Prabir Roy-Chaudhary, AZ, Diego Celdran, AZ, Begona Campos, UC, William Wagner, U. Pitt, 5/21/19



University of
CINCINNATI
OFFICE OF INNOVATION

SELF-EXPANDING BIODEGRADABLE METAL STENT



TECHNICAL FIELD
Biomedical Engineering, Cardiovascular

APPLICATION
Blood vessel, AV Fistula, expansion of any tubular structure in the body

DESCRIPTION

Many surgeons prefer stents that are self-expanding, making them easier to install in a blood vessel than balloon expandable stents. The problem with balloon expandable stents is that they expand into the plastic range and then recoil, causing high stress on the blood vessel wall during expansion. Following plastic deformation, the stents become stiff and fail to comply with pulsating blood pressure, causing continued stress on the blood vessel wall and possible deformation if impacted. These stents also develop localized cracks as a result of plastic deformation, leading to non-uniform corrosion and pieces breaking off. Typical self-expanding Nitinol stents fix some of these problems, however they are not biodegradable and can cause restenosis and other long-term problems.

The NSF ERC for Revolutionizing Metallic Biomaterials (North Carolina A&T State Univ., Univ. of Pittsburgh, and Univ. of Cincinnati) have developed a biodegradable, self-expanding metal stent that can maintain its elasticity and flexibility after expansion. This stent design reduces stress on the vessel wall, making it ideal for vein and AV Fistula applications.

For discussions around learning more or licensing this technology, please contact Ms. Madison Bourbon at the University of Cincinnati Office of Innovation today.


ADVANTAGES

- Controllable, uniform degradation
- Low vessel wall stress
- No plastic deformation
- Large expansion ratio (10/6)
- Customizable radial stiffness
- Easy delivery

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B. Patent applications filed:

1. Sankar, J.; Xu, Z.; Yarmolenko, S., "Mg-Based Biodegradable Wires for Bone Fixation Devices", U.S. Provisional Serial No. 62/665,921, Reported by Z.Xu
2. Weavable, conformable, wearable and flexible components for advanced battery technology, Filing date: 2018-09-17, Application Number: WO2019055906A1, Reported by P. Kumta
3. Electrospinning of PVDF-HFP: novel composite polymer electrolytes (CPES) with enhanced ionic conductivities for lithium-sulfur batteries, Filing date: 2018-07-09, Application Number: WO2019010474A1, Reported by P. Kumta
4. High capacity, air-stable, structurally isomorphous lithium alloy multilayer porous foams, Filing date: 2018-07-09, Application Number: WO2019010476A1, Reported by P. Kumta
5. An All-in-one Integrated, Inter-convertible foldable cell phone, tablet and personal computer, Filing date: 2018-09-07, Application Number: WO 2019/055897, Reported by P. Kumta
6. Non-Noble Metal Based Electro-Catalyst Compositions for Proton Exchange Membrane Based Water Electrolysis and Methods of Making, Filing date: 2018-11-07, Application Number: US 2018/0320278 A1, Reported by P. Kumta
7. Properties and Parameters of Novel Biodegradable Metallic Alloys, Filing date: 2018-12-04, Application Number: WO2018/191527 A1, Reported by P. Kumta
8. Peptide Conjugated Hydrogel Substrate for the Maintenance and Expansion of Human Pluripotent Stem Cells, Filing date: June 21, 2018, Application Number: US 2018/0171286 A1, Reported by P. Kumta
9. Development and Parameter Assessment for Vertically Aligned Platinum Wire Aptasensor Arrays for Impedimetric Detection of Cardiac Biomarkers, Filing date: October 11, 2018, Publication No: US 2018/0292400 A1, Reported by P. Kumta
10. Multi-Array Impedimetric Biosensors for the Detection of Concussion and Traumatic Brain Injuries, Filing date: June 14, 2018, Publication Number: WO 2018/107143 A1, Reported by P. Kumta
11. Hydrogen Sensitive Films and Sensors Produced Therefrom, University of Cincinnati, W.R. Heineman, J.A. Lynch, D.P. Rose, J. Kuhlmann, D. Zhao, P. Zhang, M.E. Smith, United States Patent Application, US 2019/0094147, Mar. 28, 2019.
12. Hydrogen Sensitive Films and Sensors Produced Therefrom, University of Cincinnati, W.R. Heineman, J.A. Lynch, D.P. Rose, J. Kuhlmann, D. Zhao, P. Zhang, M.E. Smith, German Patent Application, DE 10 2018 216 580 A1, Mar. 28, 2019.

C. Patents awarded:

1. CNT Sheet Substrate and Transition Metals Deposited on Same, U.S. Publication No. 2016/0351918, USSN 15/116,708 Filed: August 4, 2016, PCT/US15/14621 Filed February 5, 2015, Reported by Yun
2. Non-noble metal based electro-catalyst compositions for proton exchange membrane based water electrolysis and methods of making, Filing date: December 21, 2016, Patent date: August 7, 2018, Application Number: Patent # US10041179B2, Reported by P. Kumta
3. Degradable Magnesium-Based Implant Devices for Bone Fixation, Filing date: August 21, 2015, Publication date: August 9, 2018, Application Number: 62/208, 044, Reported by P. Kumta
4. Biodegradable Metal Alloys, Filing Date: May 10, 2012, Application Number: EP 12838640.6, Reported by P. Kumta
5. Biodegradable Metal Alloys, Filing Date: October 28, 2016, Application Number: 15/337, 444, Patent No: US 9, 863, 020 B2, Reported by P. Kumta

D. Licenses Issued: None

E. Spin-off Companies Started: None

F. Building Codes Impacts: None

G. Technology Standards Impacts: None

H. New Surgical and other Medical Procedures Adopted: Balloon endoscopy and novel motorized device developed for creating various gradation of stenosis in rabbit tracheal model. The device enables to create reproducible and consistent grade of stenosis in a rabbit trachea a unique milestone that does not exist to date. Animal work implementing this device is currently on-going and the results are planned to be published very soon.