University of Colorado **Boulder**

SPONSORED RESEARCH AGREEMENT

(Cost Agreement) # AWD-21-06-0160

This agreement, effective February 4th, 2022, is between Diagnamed, Inc., an Ontario Corporation, having a principal place of business at 82 Richmond Street East, Toronto, ON M5C 1P1 ("Sponsor") and the REGENTS OF THE UNIVERSITY OF COLORADO, a body corporate, acting on behalf of the Department of Department of Mechanical Engineering at the University of Colorado Boulder, a public institution of higher education created under the Constitution and law of the State of Colorado ("University"). Sponsor and University may be referred as a party or the parties.

WHEREAS, the parties have entered into an Exclusive License Agreement on December 8, 2021, pursuant to which Sponsor obtained an exclusive license from University under certain University patents rights related to University Case No. CU5481B (the "License Agreement"); and

WHEREAS, Sponsor wishes to sponsor a research project at University relating to the subject of the License Agreement and the research project contemplated by this agreement is of mutual interest and benefit to Sponsor and University and will further University's instructional and research mission;

WHEREAS, matching funds are available from University under the licensing incentive program where, in an effort to encourage and support industry – university collaborations, University is matching the proposed direct costs of Sponsor "Matching Funds";

THE PARTIES THEREFORE AGREE as follows:

Article 1 – Research Project

1.1 University shall use reasonable efforts to conduct the research project in accordance with the project research plan, titled, "Wearable Smart Bracelet for Tremor Detection", attached and incorporated herein as Appendix A ("Project") and standard scientific principles in compliance with applicable laws and regulations. The Sponsor understands that the University's primary mission is education and advancement of knowledge, and consequently, the Project has been designed to carry out that mission. As such, the University does not guarantee specific results.

1.2 The Project will be under the direction and supervision of the University's principal investigator, Professor Jianliang Xiao ("PI"). The manner of performance of the Project shall be determined solely by the PI. If Professor Xiao ceases to serve as PI for any reason, University will promptly notify Sponsor. University and Sponsor shall use good faith efforts to identify a mutually acceptable replacement within thirty (30) working days of notice. If a mutually acceptable replacement cannot be identified within 30-days, Sponsor shall have the right to terminate this Agreement upon written notice to University in accordance with Article 3.4.

1.3 University may not subcontract the Project or any portion thereof to a third party without written authorization from Sponsor. Subcontractors stated in the University's proposal or Appendix B, Budget, shall be considered authorized by Sponsor for purposes of this Article 1.3.

Article 2 – Term

The term of this agreement is from March 1st 2022 to February 28th, 2023 unless extended by mutual written agreement of the parties.

Article 3 – Consideration

3.1 In consideration of the University's performance of the Project, Sponsor shall pay University the actual cost for the Project in an amount not to exceed ("NTE") $183,800.00 US dollars, including direct and indirect costs, in accordance with the budget described in the attached Appendix B. Sponsor recognizes that the budget is the University's best estimate of the actual cost to perform the Project but is not guaranteed to reflect the entire costs of the Project due to the unpredictable nature of research. University may adjust the budget to meet the requirements of the Project including the carry forward of unexpended funds from one year to the next within the NTE amount as stated above in support of the Project without Sponsor approval.

3.2 University is a not-for-profit governmental entity with a public mission and tax exempt status. The NTE does not include tax expenses of any kind (e.g. export and import, income tax, sales tax, value added tax, goods and services tax, fees, etc.) imposed under any local, regional or national law. If any tax is levied on this Project by the local, regional or national government of the Sponsor, the University requires one of the following; 1) the NTE be increased as necessary to cover the additional cost of the tax and the Sponsor agrees to reimburse the University for the tax through a written modification to this Agreement, or 2) Sponsor takes the responsibility for payment of the taxes directly to the tax authority and provides the University with written documentation as proof the tax was paid on its behalf.

3.3 Sponsor shall pay University 50% of the full amount of the award after execution of this Agreement and invoice from the University, with the remainder paid in equal monthly amounts. Sponsor shall pay invoice within thirty (30) days of receipt of invoice. Invoices may be sent by mail or electronic means (e.g. fax, email, PDF) to:

Attention:	Accounts Payable
Mailing Address:	DiagnaMed Inc. 82 Richmond Street East
	Toronto, ON M5C 1P1
Email:	info@diagnamed.com

Payment to University shall be sent by mail or electronic means to the addresses and in accordance with the instructions stated in Appendix C, Payment Information.

3.4 If this agreement is terminated for any reason prior to the completion of the Term, University shall return unexpended funds to the sponsor, less all costs necessary to effect the early termination of

this agreement. Such costs shall include all commitments existing at the time notice of termination is received that cannot be cancelled. However, at time of termination, in no event will Sponsor's financial obligation for Project exceed the amount set forth in Appendix B as amended plus any costs incurred as a result of early termination and any tax expense as set forth in Article 3.2.

Article 4 – Reporting Requirements

If not defined in Appendix A, University will provide reports on the progress of Project in accordance with the following schedule:

- Informal, oral reports upon the Sponsor's reasonable request, and
- Written reports upon the Sponsor's reasonable request, which shall be communicated to the PI in writing and with advance notice of at least thirty (30) days prior to the requested due date.

Article 5 – Equipment and Other Property

All equipment, materials, or other property purchased by University under the terms of this Agreement shall become the property of the University upon acquisition.

Article 6 – Intellectual Property

6.1 Ownership of intellectual property developed under this Agreement will be determined by and managed in accordance with the applicable laws of the United States. Intellectual property includes the following when they arise under this Agreement ("Intellectual Property"):

a) Any art or process, machine, manufacture, design, or composition of matter, or any new and useful improvement thereof, or any variety of plant, which is or may be patentable under the patent laws of the United States ("Inventions");

b) Original works of authorship fixed in a tangible medium of expression under the copyright laws of the United States ("Works"); and

c) Data, test results, and laboratory notebook entries developed or made as a result of the Project ("Data").

6.2 University shall retain title to all Intellectual Property created by University under this Agreement (hereinafter collectively "University IP," and individually, "University Inventions," "University Works," and "University Data"). Title to Intellectual Property created jointly by University and Sponsor under this Agreement shall be jointly owned by both parties without permission from or accounting to the other party (hereinafter collectively "Joint IP", and individually, "Joint Inventions", "Joint Works," and "Joint Data.").

6.3 Inventorship for patentable Inventions, whether University Inventions or Joint Inventions, conceived of and first actually reduced to practice in the performance of this agreement shall be

determined in accordance with United States patent law. The parties shall obtain and have in force all appropriate patent and invention agreements with their personnel who may be involved with this agreement in order to ensure compliance with this agreement. University shall have responsibility for the preparation, filing, prosecution, maintenance, and enforcement of patents directed to University Inventions and Joint Inventions, unless otherwise agreed by the parties in writing.

6.4 University shall disclose to Sponsor any University Inventions and both parties shall disclose to the other party any Joint Inventions within thirty (30) days of it becoming aware of the Invention. On the part of University, University is aware of an Invention when its Venture Partners office receives an invention disclosure that discloses an Invention. The receiving party shall treat all invention disclosures received under this Agreement as Information of University for University Inventions and Information of both parties for Joint Inventions under Article 7 of the Agreement.

6.5 To the extent it is legally able to do so, University will offer Sponsor an exclusive option to acquire an exclusive, worldwide, royalty bearing license in the Field of Use of the License Agreement to University Inventions and its interests in Joint Inventions ("Option"). Once notified of a University Invention or the confirmation of a Joint Invention, Sponsor shall have thirty (30) days to elect the Option. If elected by Sponsor in writing within thirty (30) days, such Option shall extend for six (6) months after election and shall be granted to Sponsor without fee other than the consideration of the research sponsored herein and the reimbursement to University for all patent expenses incurred for the University Invention or Joint Invention, as applicable, prior to and during the Option period and appertaining license negotiation period. If Sponsor notifies University in writing of its exercise of the Option within the Option period, then the parties shall negotiate in good faith a mutually beneficial license agreement within sixty (60) days after notification. If Sponsor does not exercise the Option, notifies University that it will not exercise the Option, or the parties fail to sign a license agreement within said sixty (60) day negotiation period, then Sponsor's option to University's rights in the Invention shall terminate.

Article 7 – Publications and Confidentiality

7.1 The Principal Investigator has the right to publish or otherwise publicly disclose information and results gained in the course of the Project. University agrees to submit a copy of any proposed publications of the results of the Project to Sponsor for review at least thirty (30) days prior to final submission for publication. Should Sponsor determine that the proposed publication contains patentable subject matter requiring patent protection, University shall delay publication for a period of time not to exceed an additional thirty (30) days for the purpose of allowing the filing of patent applications.

7.2 Confidential information ("Information") is information that is not generally known to the public from which, a party may derive economic value as long as it is kept confidential by a party using reasonable means. Information includes, but is not limited to, any and all information, data, technical and non-technical materials, designs, processes, product samples and specifications, financial or business information, whether or not patentable, furnished by one party of this agreement ("disclosing party") to the other ("receiving party"), either directly or indirectly, in writing or tangible form, and clearly marked "Proprietary" or "Confidential,' or which if disclosed

orally or visually, is reduced to writing by the disclosing party, clearly marked Proprietary or Confidential and transmitted to the receiving party within fifteen (15) days of disclosure. For absence of doubt, this agreement shall not be considered Information.

A receiving party's obligations to protect the Information of the disclosing party shall not include information that:

- at the time of disclosure had been previously published or was otherwise publicly available through no fault of receiving party;
- becomes publicly available after disclosure unless such knowledge results from a breach of this agreement;
- was already in receiving party's possession prior to the time of disclosure as evidenced by written records kept in the ordinary course of business or by proof of actual use thereof;
- is independently developed without use of the disclosing party's Information;
- is not disclosed or subsequently reduced to writing and labeled with an appropriate proprietary legend within fifteen (15) days of disclosure;
- becomes known to receiving party from a source other than the disclosing party in a manner that does not knowingly breach an obligation of confidentiality owed to the disclosing party; or
- is approved for release or use by written authorization of the disclosing party.

7.3 The receiving party's duty to protect the Information in accordance with the terms of this agreement will extend 3 years from the completion of the agreement, notwithstanding agreements by the party to extend the term of the agreement. All written documents containing Information and other material in tangible form received by either party under this agreement shall remain the property of the disclosing party, and such documents and materials, together with copies of excerpts thereof, shall promptly be returned to disclosing party upon request, except one copy may be retained for archival purposes.

7.4 Notwithstanding the foregoing, the receiving party may disclose Information as required by law, court order, or government regulation provided however, that the receiving party provides notice to the disclosing party to provide disclosing party with an opportunity to minimize or oppose such disclosures. Sponsor acknowledges that University is subject to the Colorado Open Records Act (C.R.S. §§ 24-72-201 et seq.) ("CORA") and that University's obligations under CORA supersede its obligations under this provision. Appropriately marked Information shall be treated by University as confidential/proprietary to the extent permitted under CORA.

7.5 Either party may decline to accept Information provided under this agreement prior to its disclosure and nothing herein obligates either party to disclose its own Information.

Article 8 – Liability and Insurance

8.1 ALL INTELLECTUAL PROPERTY DEVELOPED BY THE UNIVERSITY UNDER THIS AGREEMENT IS PROVIDED TO SPONSOR "AS IS." UNIVERSITY MAKES NO REPRESENTATION OR WARRANTY AS TO THE ACCURACY, COMPLETENESS, OR FITNESS FOR ANY PURPOSE OR CONDITION INCLUDING FREEDOM FROM ANY PATENT OR OTHER INTELLECTUAL PROPERTY INFRINGEMENT WITH RESPECT

TO INTELLECTUAL PROPERTY PROVIDED UNDER THIS AGREEMENT, INCLULDING, BUT NOT LIMITED TO, THE PROJECT RESULTS, THE DELIVERABLES, OR PUBLICATIONS RESULTING FROM THE PROJECT, WHETHER WRITTEN OR ORAL, STATUTORY, EXPRESSED OR IMPLIED.

8.2 Sponsor agrees to indemnify and hold harmless University, its Regents, officers, agents and employees from any liability, loss or damage they may suffer as a result of claims, demands, costs or judgments against them arising out of the activities to be carried out pursuant to the obligations of this agreement, including but not limited to the use by Sponsor of the Project results; provided, however, that the following is excluded from Sponsor's obligation to indemnify and hold harmless:

a) The negligent failure of University to substantially comply with any applicable United States governmental requirements; or

b) The negligence or willful malfeasance of any Regent, officer, agent or employee of University.

8.3 The University shall be responsible for the negligent acts and omissions of its officers, agents, employees and legal representatives with respect to its obligations under this Agreement. The Sponsor understands and agrees that the liability of the University, the State of Colorado and their officers and employees, relating to actions that lie in tort or could lie in tort, is controlled and limited by the Colorado Governmental Immunity Act, Colorado Revised Statute ("CRS") § 24-10-101 et seq. The Sponsor also agrees that nothing in this Agreement shall be construed as a pledge of the full faith and credit of the State of Colorado, as the assumption by the University of a debt, contract or liability of the Sponsor in violation of Section 1 of the Constitution of the State of Colorado. Any provision in this Agreement, whether or not incorporated herein by reference or otherwise, will be controlled or otherwise modified to limit any liability of the University, the State of Colorado and their officers and employees to that set forth in the above-cited laws.

8.4 Both parties agree that upon receipt of a notice of claim or action arising out of the Project, the party receiving such notice shall notify the other party promptly. Sponsor agrees, at its own expense, to provide attorneys to defend against any actions brought or filed against University, their Regents, officers, agents and/or employees with respect to the subject of the indemnity contained herein, whether such claims or actions are rightfully brought or filed; and subject to the statutory duty of the Colorado Attorney General, University agrees to cooperate with Sponsor in the defense of such claim or action.

8.5 Each party represents that it has adequate liability insurance for the protection of itself and its officers, employees, and agents, while acting within the scope of their employment by the party. University may request the appropriate certificates of insurance from Sponsor for the purpose of ascertaining the sufficiency of such coverage.

Article 9 – Independent Contractor

In the performance of the agreement, neither party is authorized or empowered to act as agent for the other party nor shall one party be bound by the acts or conduct of the other party. Each party shall act as an independent contractor and not as an employee of the other. The parties, nor any agent or employee of either party, shall not be entitled to unemployment insurance or workers compensation benefits through the other party.

Article 10 – Compliance with Laws and Disputes

10.1 Each party agrees to comply with applicable laws and regulations in the performance of Project.

10.2 This agreement shall be governed by and construed in accordance with the laws of the State of Colorado. Venue of any action brought under this agreement shall be in Denver, Colorado.

10.3 In cases where a dispute arises in relation to this agreement, the parties agree to make every effort to settle it upon non-binding dispute resolution.

Article 11 – Use of Name

Neither party shall use the name of the other party in any advertising, sales promotion nor other publicity matter without prior written approval, except as may be required under CORA.

Article 12 – Audit and Retention of Records

Sponsor shall have reasonable access to documents and records of University related to this Project to audit or examine under the terms of confidentiality per Article 7. Documents relating to this Agreement shall be retained by the parties for a period of three years from the date of termination or completion of the Term.

Article 13 – Termination

13.1 This agreement may be renewed for additional periods upon the mutual consent of the parties by written amendment hereto. Either party may terminate this agreement in accordance with Article 3.4 by giving the other party at least thirty (30) days prior written notice of such termination. In the case of such termination, University will proceed in an orderly fashion to terminate any outstanding commitments and to stop the work as soon as it is practicable to do so.

13.2 In the event that either party commits a material breach of its obligations under this agreement and fails to cure that breach within sixty (60) days after receiving written notice of the breach from the non-breaching party, the non-breaching party may terminate this agreement immediately upon written notice to the party in breach.

13.3 Termination of this agreement, however effectuated, shall not release the parties from their rights and obligations under the above Articles on Consideration, Equipment and Other Property, Intellectual Property, Publications and Confidentiality, Indemnity and Insurance, Use of Name, Audit and Retention of Records and Export Control.

Article 14 – Export Control

Each party agrees that it shall be responsible for its own compliance with applicable United States federal, state and local laws, regulations or orders in relation to the export or re-export of controlled items including, but not limited to, information, technical data, equipment, technology, materials and software (cumulatively "Technical Data"). Neither party shall export, re-export or disclose any Technical Data subject to applicable United States export laws to a Foreign Person (as defined in applicable laws and regulations) or country without the approval of the appropriate federal agency responsible for such approvals such as NASA (NFS 1852.225-70 Export Licenses); the US Department of State (22 CFR Parts 120-130 – ITAR); the US Department of Commerce (15 CFR Parts 730-774 – EAR) or the US Treasury Department's Office of Financial Asset Controls. The University is not obligated to share or receive Technical Data that is controlled for export purposes.

Article 15 – Order of Precedence

In the event of a conflict between the Articles of this agreement and the appendixes and attachments hereto, the conflict shall be resolved by the following order of precedence:

The Articles of the agreement
The project research plan, Appendix A
The budget, Appendix B

Article 16 – Notification to the Other Party

All notification required by this Agreement shall be executed in writing by the parties hereto and shall be directed to the following individuals:

For University:	For Sponsor:
[Redacted]	*[Redacted]*
With a copy to:	With a copy to:
Principal Investigator	N/A

Article 17 – General

17.1 This agreement constitutes the complete and final agreement between the parties. Terms and conditions which may be set forth (front, reverse, attached or incorporated) in any purchase order issued by Sponsor in connection with this agreement shall not apply, except for informational billing purposes; i.e., reference to purchase order number, address for submission of invoices, or other invoicing items of a similar informational nature.

17.2 Any modifications to this agreement or the Project must be executed in writing by the authorized representatives of the parties.

17.3 The failure of a party in any instance to insist upon the strict performance of the terms of this agreement will not be construed to be a waiver or relinquishment of any of the terms of this agreement, either at the time of the party's failure to insist upon strict performance or at any time in the future, and such terms will continue in full force and effect.

17.4 Each clause of this agreement is a distinct and severable clause and if any clause is deemed illegal, void or unenforceable, the validity, legality or enforceability of any other clause or portion of this agreement will not be affected thereby.

17.5 Neither party may assign or transfer any interest in this agreement, without the prior written approval of the other party.

This agreement may be executed in counterpart, and photocopy, facsimile, electronic or other copies shall have the same effect for all purposes as an ink-signed original.

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IN WITNESS WHEREOF, the parties hereto have executed this agreement by their respective, duly authorized officers.

For **University:**	For **Sponsor:**
(s) James Uhes	*(s) Fabio Chianelli*
Signature	Signature
James Uhes	Fabio Chianelli
Name	Name
Assistant Director	Chief Executive Officer
Title	Title
3/16/2022	3/16/2022
Date	Date

APPENDIX A – PROJECT RESEARCH PLAN

Wearable Smart Bracelet for Tremor Detection

Jianliang Xiao
Department of Mechanical Engineering, University of Colorado Boulder

1. Summary

This project is to develop a wearable smart bracelet that can be worn by Parkinson's disease (PD) patients for continuous and accurate detection of tremor. Figure 1a shows a schematic illustration of the conceptual smart bracelet worn on a patient's arm. This development builds upon the recent progresses on mechanical design, novel materials, and integration strategies on flexible electronics in Dr. Xiao's lab. It will lead to a flexible and low-cost smart bracelet device that is comfortable to wear, and more importantly can address some challenges in the current practices of treating PD and improving patients' quality of life.

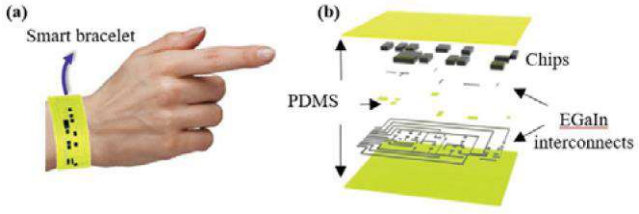

Figure 1. (a) Smart bracelet for tremor detection. (b) Breakout view of the bracelet design.

2. Introduction and Background

As the second most common neurodegenerative disease, Parkinson's disease (PD) has caused significant decrease in patients' life quality and burden to the medical system (1). To control the movement symptoms of PD, medication and deep brain stimulation can be used. For medication treatment, it's critically important to precisely titrate medications according to the patients' severity of tremor, in order to improve patients' quality of life (2-4). Currently, the assessment of motor system severity is only conducted during in-clinic visits, with time gaps of a few months. However, the tremor severity in a PD patient can change from time to time. Therefore, out-of-clinic symptom tracking and assessment are important but remain challenging. The current approach of out-of-clinic symptom tracking is reported by patients, which can be error prone and unreliable (5-10). Such issues make it difficult for doctors to precisely titrate medication for controlling movement symptoms. Hence, it's highly desirable to develop a device that can be worn by PD patients to provide continuous and accurate monitoring of tremor.

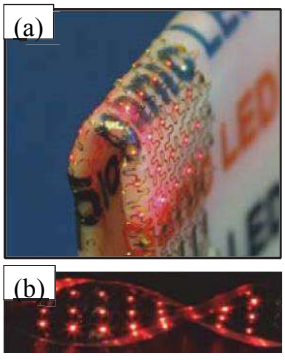

Figure 2. Electronic devices that can (a) fold and (b) twist.

Flexible electronics retains the superior electronic performance of conventional wafer based single crystalline silicon devices, and at the same time possesses the mechanical properties of a rubber band (*11-14*). Therefore flexible electronics can be stretched, folded, bent and twisted while functioning, such as the two examples shown in Fig. 2a and 2b. Such mechanical nature of flexible electronics enables very broad applications that are impossible for hard, planar integrated

circuits that exist today. Examples range from surgical and diagnostic implements that can seamlessly integrate with the human body to provide advanced therapeutic capabilities, to structural health monitors and inspection systems for civil and aerospace engineering (*11-19*). Wearable electronics, sensory skins and artificial muscles for robotics, bio-inspired eye shaped cameras with superior performance, and other systems that require light weight, thin and conformal formats will also be possible (*20-27*). By adopting flexible electronics design principles, we propose to develop a wearable smart bracelet that can address the aforementioned challenges.

3. Statement of the work

The goal of this project is to take advantage of the progresses on mechanical design, novel materials and integration strategies in Dr. Xiao's lab to develop a wearable smart bracelet device that can continuously and accurately detect PD patients' tremor (28-35). We propose to integrate an accelerometer and gyroscope into a flexible electronics platform, in order to achieve a device that is high-performance, flexible, low-cost and comfortable to wear. Such device could provide a reliable tool for doctors to precisely titrate medication for PD treatment. In addition, this device could also provide data for early diagnosis of PD in elderly population.

Design and materials: The device will take a multilayer design, as schematically illustrated in Fig. 1b. High-performance semiconductor chips will be interconnected by conductive and stretchable wires, which are sandwiched between polymer encapsulation layers for protection. For optimal electronic performance, off-the-shelf miniature 3-axis sensing accelerometer and gyroscope chips that can meet our sensing range (-3-+3 g), sensitivity (300 mV/g) and accuracy (0.01 g) requirements will be selected. In order to achieve a combination of high conductivity and deformability performance, we propose to use liquid metal Eutectic Gallium-Indium (EGaIn) for interconnecting material. From our previous studies, EGaIn provides a conductivity of 3.4×10^6 S/m, mechanical rigidity of zero, and infinite stretchability in theory. In addition, it's easy to process and pattern. Compared with serpentine metal interconnects widely used in flexible electronics, liquid metal interconnects are much cheaper, more deformable and reliable. For encapsulation, we plan to use polydimethylsiloxane (PDMS), as this material is easy to synthesize, low-cost, mechanically compliant, and biocompatible.

Fabrication and integration strategies: We propose to use a low-cost and scalable process to fabricate the smart bracelet, as illustrated in Fig. 3. A silicon paper mask will be made using laser cutting technique, and then laminated onto a PDMS film substrate. The pattern of the silicon paper mask defines the circuitry of the device. Liquid metal will then be dispensed over the mask. Excessive liquid metal will be removed by using a razor blade. The liquid metal can be solidified by cooling down the materials to a temperature below EGaIn's freezing point (15.7 °C). Afterwards, the silicon paper mask can be easily peeled off, and the solidified liquid metal traces will be left on the PDMS film. The semiconductor chips will then be placed onto the designated contact pads under microscope. This process is similar to PCB

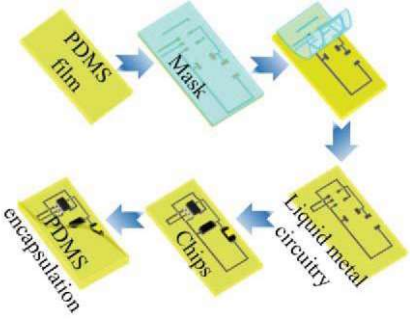

Figure 3. Fabrication process of the smart bracelet.

fabrication, but without the need of soldering. Our previous studies have shown that liquid metal has very good wettability with the metal pins of chips, leading to robust connection even when the device is under large deformation. Finally, pouring and curing PDMS prepolymer encapsulate the device and complete the fabrication process.

Finite element simulation and mechanical testing: To ensure the mechanical performance of the smart bracelet under large deformation during daily wearing, finite element method (FEM) simulation will be conducted during the design stage. Dr. Xiao's group has extensive experience of conducting analytical and numerical studies of soft materials, thin films and flexible electronics systems (28-35). In this bracelet design, because the silicon chips are much more stiffer than the PDMS encapsulation (their Young's moduli are 70 GPa and 2 MPa, respectively), our previous studies have shown that the deformation in the chips should be much smaller than in the PDMS (28, 32). Therefore, the chip components can be modeled as elastic material using 3D stress element (C3D8), while the PDMS can be modeled as Neo-Hookean hyperelastic material using 3D hybrid stress elements (C3D8H). FEM simulations will be conducted before the fabrication in order to optimize the design. After the design is finalized and devices are fabricated, mechanical testing will be performed using an Instron mechanical testing system. Quasi-static bending and tensile test will be carried out. A target bending radius of curvature of 10 mm and tensile strain of 30% will be adopted. We expect this strain level will be sufficient for the bracelet device. If necessary, a higher strain will be used, and cyclic testing can also be performed to ensure device performance under more practical conditions.

Sensing performance testing and optimization: Basic sensing performance of the smart bracelet will be tested in Dr. Xiao's lab. A student/postdoc wearing the bracelet will make motions similar to tremor. The signals collected from the bracelet will be compared with the data when the wearer is not moving, to prove the capability of tremor detection. After validation, the devices can be sent to Diagnamed for further testing on patients. Based on the feedbacks from Diagnamed, further adjustments, improvements, and optimization can be made to the device design, materials and fabrication process.

Wireless operation and communication: It's critically important to have wireless communication capability integrated into the smart bracelet for deployment to patients for clinical studies. We plan to include a battery and a Bluetooth module into the smart bracelet to enable wireless operation and communication with smart phones (iPhone or Android phones), so that data can be collected and sent to smart phones for storage and analysis. This also requires development of a smart app that is compatible with the select smart phone platform (either iPhone or Android phones). We will compare the data communicated through the wireless app with data collected using wired system to validate the reliability. However, given the amount of work required and the nature that this development has to take place after the device is nearly completed, this task could go beyond the one-year timeframe.

4. Milestones

This proposed project will take one year to complete, the quarterly milestones of the project are listed in the table below.

Milestones	**Q1**	**Q2**	**Q3**	**Q4**
Define materials and chip components				

Finalize initial design				
FEM simulation of device for design optimization				
Fabrication process development and optimization				
Mechanical testing				
Sensing performance testing and optimization				
Wireless operation and communication				

APPENDIX B – BUDGET

Duration:		02/01/2022 - 01/31/2023					Year 1			VP Match
A.	**Salaries and Wages**									
	PI: Xiao Jianliang									
	100% time, 1 months, Summer						14,077			
	Research Associate:									
	100% time, 12 months, CY						50,417			
	Undergraduate Research Assistant									
	$15/hr, 10 hours/week, 39 weeks AY; $15/hr, 20 hours/week, 13 weeks Summer						9,750			
	Undergraduate Research Assistant									
	$15/hr, 10 hours/week, 39 weeks AY; $15/hr, 20 hours/week, 13 weeks Summer						9,750			
	Total Salaries and Wages						83,994			
B.	**Fringe Benefits**					***Rate***				
	PI: Xiao Jianliang					*29.00%*	4,164			
	Research Associate:					*37.00%*	19,027			
	Hourly Personnel					*1.30%*	259			
	Total Fringe Benefits						23,450			
	Total Salaries and Wages and Fringe Benefits						107,444			
C.	**Capital Equipment**									
	Total Capital Equipment						0			
D.	**Travel**									
	Total Travel						0			
E.	**Participant Support**									
	Total Participant Support						0			
F.	**Other Direct Costs**									
	Materials and Supplies									
	Lab Supplies						5,000			
	Other Direct Costs									
	Clean room fee						5,000			
	Total Other Direct Costs						10,000			
G.	**Total Direct Costs**						**117,444**			**117,444**
H.	**Facilities and Administration (F&A) Costs**					*IDC Exclusions*	*0*			
	Research	On-Campus		IDC Base:		MTDC	*117,444*			
	Predetermined for the period 7/1/16-6/30/18:					56.5%				
	Provisional thereafter per HHS agreement dated 6/24/2020.						66,356			
I.	**Total Costs**						183,800			

APPENDIX C - PAYMENT INSTRUCTIONS

Payment Information

[Redacted]