IPRO 331 Spring 2005 PROJECT PLAN

PROFESSOR: Dr. Emmanuel Opara
Consultants: Ray DeBoth

TEAM MEMBERS: Leland Barnard, Ben Freemire, Yio-Fan (Deborah) Hsu, Jude Kieltyka, Wadzanayi (Wadzi) Maketiwa, Stephen Mullins, Mehjabeen (Maje) Nazim, Veeral Oza, Prabhav Patil, Quratulann (Annie) Riaz, Vidya Shivakumar, Daniel Young

OBJECTIVES: The objective of this IPRO project is to investigate, research, and develop methods of non-invasive blood glucose monitoring, with a view towards continuing the work of the previous IPRO 331 team (Fall 2004).

BACKGROUND: Diabetes affects millions of Americans. The development of a non-invasive procedure for monitoring blood sugar levels in people with diabetes is a key factor in controlling diabetes. Most of the current techniques for monitoring blood sugar levels in diabetic patients require blood sampling through venepuncture, a procedure that is considerably invasive and uncomfortable for most pediatric patients. Hence, it is important to find a reliable non-invasive method for blood glucose level detection and regulation.

METHODOLOGY: The goals of this IPRO will be met using the following techniques:

- Meeting with prospective sponsors
- Meeting with staff/administration/faculty of Illinois Institute of Technology and other interested partners
- Research of previous IPRO designs
- Research of the state of the art/current devices
- Research and improve on different device designs
- Looking into patenting procedures
- Design and test a prototype in a lab setting

EXPECTED RESULTS: To improve on the current prototype for non-invasive blood glucose monitoring device and answer questions such as:

- What specific frequency is best for impedance spectroscopy
- What are the exact vacuum pressures needed (sweat and interstitial fluid)?

- Will heat work to open micro-channels for drawing up interstitial fluid? Would sweat be a problem?
- Address problems related to reverse iontophoresis

SCHEDULE OF TASKS/TIMELINE:

WEEK OF	TENTATIVE TASKS
1/17	○ Introductions ○ Review of last semester's work
1/24	○ Dr. Opara's lecture on diabetes ○ Set up group webpage
1/31	○ iKNOW presentation ○ Splitting tasks into groups ○ Lecture on patents, by Dr. Gottlieb
2/7	○ Look into insulin delivery ○ Look into impedance spectroscopy frequencies
2/14	○ Determine exact vacuum pressure for drawing up interstitial fluid and sweat ○ Work on prototype
2/21	○ Study problems related to reverse iontophoresis
2/28	○ Work on Midterm Report ○ Start work on website
3/7	○ Look into sponsorships ○ Work on portfolio to present to companies ○ Submit midterm report
3/14	○ Work on research project ○ Work on BME-IDEA Competition entry
3/21	○ Look into patents
3/28	○ Test prototype
4/04	○ Work on remaining drawbacks of prototype and interstitial fluid and sweat suction methods
4/11	○ Work on poster ○ Submit BME-IDEA Competition entry
4/18	○ Work on IPRO presentation. ○ Work on final report
4/29	○ IPRO DAY
5/6	○ Final Report

ASSIGNMENTS:

Device Design
Yio-Fan (Deborah) Hsu
Prabhav Patil
Quratulann (Annie) Riaz
Vidya Shivakumar

Patent Work
Leland Barnard
Daniel Young
Stephen Mullins

Prototype
Ben Freemire
Wadzanayi (Wadzi) Maketiwa
Daniel Young

Research
Jude Kieltyka
Mehjabeen (Maje) Nazim
Veeral Oza
Quratulann (Annie) Riaz

Sponsorship
Jude Kieltyka
Wadzanayi (Wadzi) Maketiwa
Mehjabeen (Maje) Nazim
Vidya Shivakumar

Project Plan Report
Yio-Fan (Deborah) Hsu
Wadzanayi (Wadzi) Maketiwa
Mehjabeen (Maje) Nazim

Oral Presentation
Jude Kieltyka
Veeral Oza
Prabhav Patil

Midterm Progress Report
Quratulann (Annie) Riaz
Yio-Fan (Deborah) Hsu

Team Minutes
Mehjabeen (Maje) Nazim

Team Poster
Leland Barnard
Vidya Shivakumar

BME-IDEA Competition entry
Jude Kieltyka
Mehjabeen (Maje) Nazim
Yio-Fan (Deborah) Hsu
Quratulann (Annie) Riaz

Final Report
Leland Barnard
Ben Freemire
Vidya Shivakumar