

Visualizing Microcirculation via Laser Doppler Imaging Research Grants: Call for Proposals

Next deadline - September 15th 2011

Aimago SA, a Swiss based Medical Device Company involved in the research, development, and commercialization of Laser Doppler Imaging (LDI) Technology (www.aimago.com) announces its **2011 Research Grants competition in the Visualization of Microcirculation in Medicine**. Aimago makes this announcement with an endorsement from the Swiss Federal Institute of Technology in Lausanne (EPFL) (www.epfl.ch) and in cooperation with the European Society for Microcirculation (www.esmicrocirculation.eu)

The program seeks to stimulate research on uses and applications of LDI in the visualization of microcirculatory perfusion. The program supports research projects that encourage the adoption of LDI technology in a clinical setting, while allowing for the research to be explorative in nature. Priority will be given to projects as follows:

- One grant will be earmarked to Diabetic wounds
- One grant will be earmarked to Rheumatic Skin Disease
- Two grants will be completely free, to be decided by the committee depending on quality of proposals
- For all four grants, preference will be give to human studies

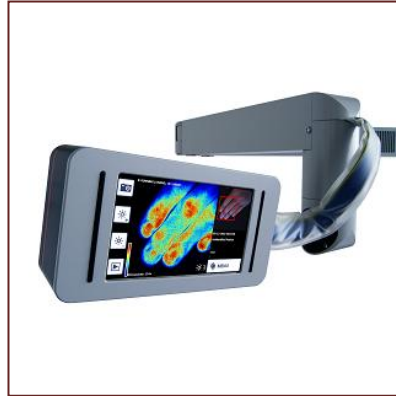
Description

Aimago invites proposals that seek to **explore the potential of LDI technology in analyzing microcirculatory perfusion in a clinical setting**. In this respect, pre-clinical research protocols will be considered if they bear a clear relationship to possible future clinical applications. Submissions should be in the form of proposed study protocol (max 5 pages), with **preference given to studies that can be executed in 6 months (time from first case in to close of follow up)**.

The research is to be undertaken with a contactless, stand mounted portable camera (dimensions; 13x25 cm) which covers an area of 7x7 cm at up to 456x448 pixels (155µm resolution), and which has a penetration depth of up to 2 mm in skin. The LDI camera in this research program provides up to 25 images per second, eliminating movement artifacts caused by heartbeat, breathing & patient movement (See Appendix I for further information on the Camera)

The Camera will be made available to awardees for the duration of the study in either of two ways, at the awardees discretion: either the Aimago EasyLDI camera (see figure below) at a reduced rate, or the research version of the same camera Free of Cost.

Aimago EasyLDI
Stand Mounted Microcirculation Camera



Eligibility

Applicants should be based in Europe and may either be based in a University Hospital or in an Institution that routinely undertakes research. Applicants must be qualified Medical Doctors or have received Doctoral Degree or PhD in Vascular Biology or related area.

Awards

Awards for Research Grants are up to Euros 20'000 for 6 months (maximally 1-year) projects. A total of 4 Research Grants are planned for 2011-2012, although depending the quality of the proposals, more or less grants may be awarded.

Application Requirements

All applications for Research Grants must include:

- Information on the PI (contact and background information, current curriculum vitae, list of relevant publications), and Co-PI(s) (if applicable.)
- Abstract of the proposed research project (maximum 250 words)
- Statement of how this research advances the current state of knowledge in the field.

The Research proposal (limited to 5 single-spaced pages) should address the following:

1. Purpose
2. Study Title
3. Study Objectives
4. Study Design and Time Plan
5. References
6. Publication plan for proposed research
7. Proposed Budget

Evaluation criteria

Evaluation criteria will include (a) the importance of the proposal in fostering clinical microcirculation and/or microcirculation research (b) its relevance to the development of LDI technology in the disease or therapeutic area targeted by the protocol, with a focus on how such study may encourage adoption of this technology in the clinical setting, and (c) the relevant experience, research and publication record of the applicant.

An interdisciplinary committee composed of the following members will evaluate proposals:

- **Professor Axel Pries (D)**, Department of Physiology, Berlin Charité, and General Secretary, The European Society for Microcirculation
- **Professor Giuseppe Ambrosio (I)**, Director of Cardiology, University of Perugia, Italy, visiting Associate Professor, Johns Hopkins, Baltimore USA, and ex-Chair, European Society of Cardiology (ESC) Working Group on Microcirculation
- **Professor Angela C. Shore (UK)**, Professor of Vascular Physiology and Director of Biomedical Research, Peninsula Medical School, Institute of Biomedical & Clinical Science, Universities of Exeter and Plymouth
- **Professor Aristidis Veves, MD, MSc (USA)**, Associate Professor Surgery, Harvard Medical School, and Research Director for the Podiatry team and Microcirculation lab, Beth Israel Deaconess Medical Center
- **Professor Theo Lasser (CH)**, Professor of Biomedical Optics, École Polytechnique Fédérale De Lausanne (EPFL)/Swiss Federal Institute of Technology.
- **Michael Friedrich (CH)**, Master in Micro technology in Life sciences EPFL, and Aimago CEO

Application Deadlines

Proposals for Research Grants will be reviewed during the course of the month following submission deadline, with funding decisions made within the same month. Upcoming deadlines for proposals are:

- Submission deadline: September 15th 2011
- Announcement of the winner(s) by October 15th 2011

Application Submission

Proposals must be submitted electronically to marta.gehring@aimago.com and the deadline for submission is 11:59pm on Thursday September 15th, 2011. Applicants are encouraged to **submit proposals in advance** of the deadline.

Contact Marta Gehring at marta.gehring@aimago.com if you have questions regarding the application or submission process (your question will then be reviewed by the interdisciplinary committee)

Important Additional Information Regarding Research Grants

Budget

There is no specific format for the budget section, except that funds should be used in connection with the execution of the study protocol, including lab equipment, related staff, data entry and computing time, and professional travel if needed.

Funding Restrictions

Research grantees may accept additional grant or fellowship awards from another agency, foundation, institution or the like for the same research project that is funded by the Aimago SA, but are kindly requested to advise Aimago of the same, before accepting such funding

Reporting Requirements

All Research Grantees will be required to submit a brief (3-6 pages) progress report mid-way through the grant period. A final report will be submitted at the end of the grant period.

The final report should be a Study Report and/or an article based on the proposed research, in the format required for submission to the targeted journal.

Publications

Any articles or abstracts to scientific meetings based on the results of the proposed research, should be forwarded to Aimago, in the format required for final submission, at least 4 weeks in advance of planned submission. Aimago

reserves the right to evaluate it for possible infringement of existing patent rights, and for the purpose of suggesting changes/improvements in presentation/publication. Aimago will not otherwise unreasonably prevent publication.

New Patenting

Rights for future patent application rest with Aimago. No patent applications can be presented by awardees based upon the results of research projects.

Funding Disbursement

Funding will be disbursed in relation to the approval of the project, to the submission of the progress report, and to the submission of the final report and draft publication.

Grantees will receive 30% of the total award within 30 days of grant approval, 40% upon submission of the progress report, and the final 30% upon submission of the final report and planned publication

In most cases, awardees may choose whether to have funds sent directly to them or have the funds channeled through their institutions. If the award is channeled through the PI's institution, no overhead or indirect costs are allowed on Aimago grant funds.

Appendix I

Description of Aimago LDI Microcirculation camera.

Microcirculation Camera

PRODUCT DEFINITION

- Contactless camera for **visualizing microcirculatory perfusion in real-time**
- Simultaneously records LDI and white light images, **like a digital camera**
- Images exportable to USB key as JPEG's

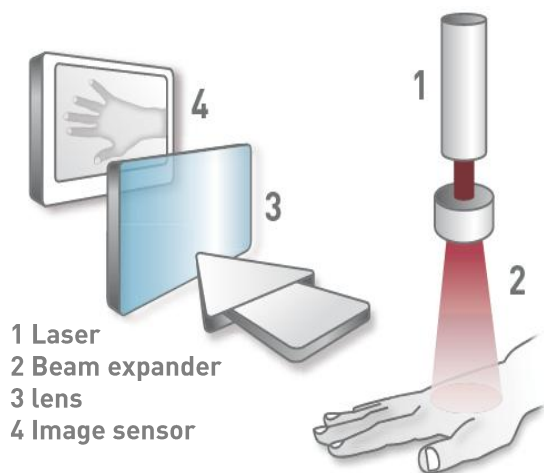
PURPOSE

- **Repeatable and observer independent** visualization of
 - Local concentration of red blood cells per unit volume
 - Local mean speed of red blood cells
 - Local perfusion (concentration x speed)
- **Area covered** = 7 x 7cm at up to 456 x 448 pixels (160µm resolution)
- **Penetration depth** = 1 to 2 mm in skin

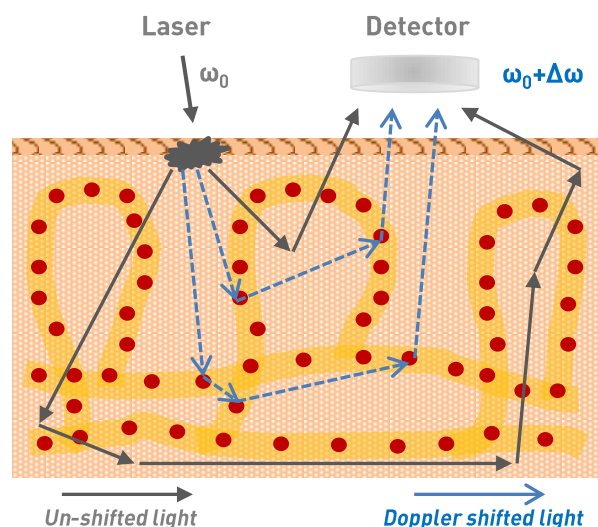
HOW IT WORKS

- Optical imaging modality: a **Laser light source (808nm, near infrared)** illuminates and penetrates skin where it is reflected both by moving red blood cells and static tissue
- Light interacting with erythrocytes changes frequency due to the **Doppler effect**
- A special high-speed camera acquires 20'000 images per second to sample the frequency spectrum and then analyzes it on a pixel-to-pixel basis, and by measuring the Doppler signal on a scale from 0-255
- **Perfusion, concentration and average speed** information is calculated and shown at a frequency of up to 25 images per second (fps)

CONCEPT OF LDI



LASER - BLOOD INTERACTION



APPLICATIONS

- Optical concept, thus requiring direct visual access or coupling with endoscope
- **Pre-, intra- and post-operative** use

SAFETY

- LDI Camera is Laser class 2m, which is **safe to use without eye protection** glasses
- Used like a digital camera that can be enveloped by a disposable sterile sleeve for use in **sterile environments**

ADVANTAGE OF CURRENT DESIGN CONCEPT

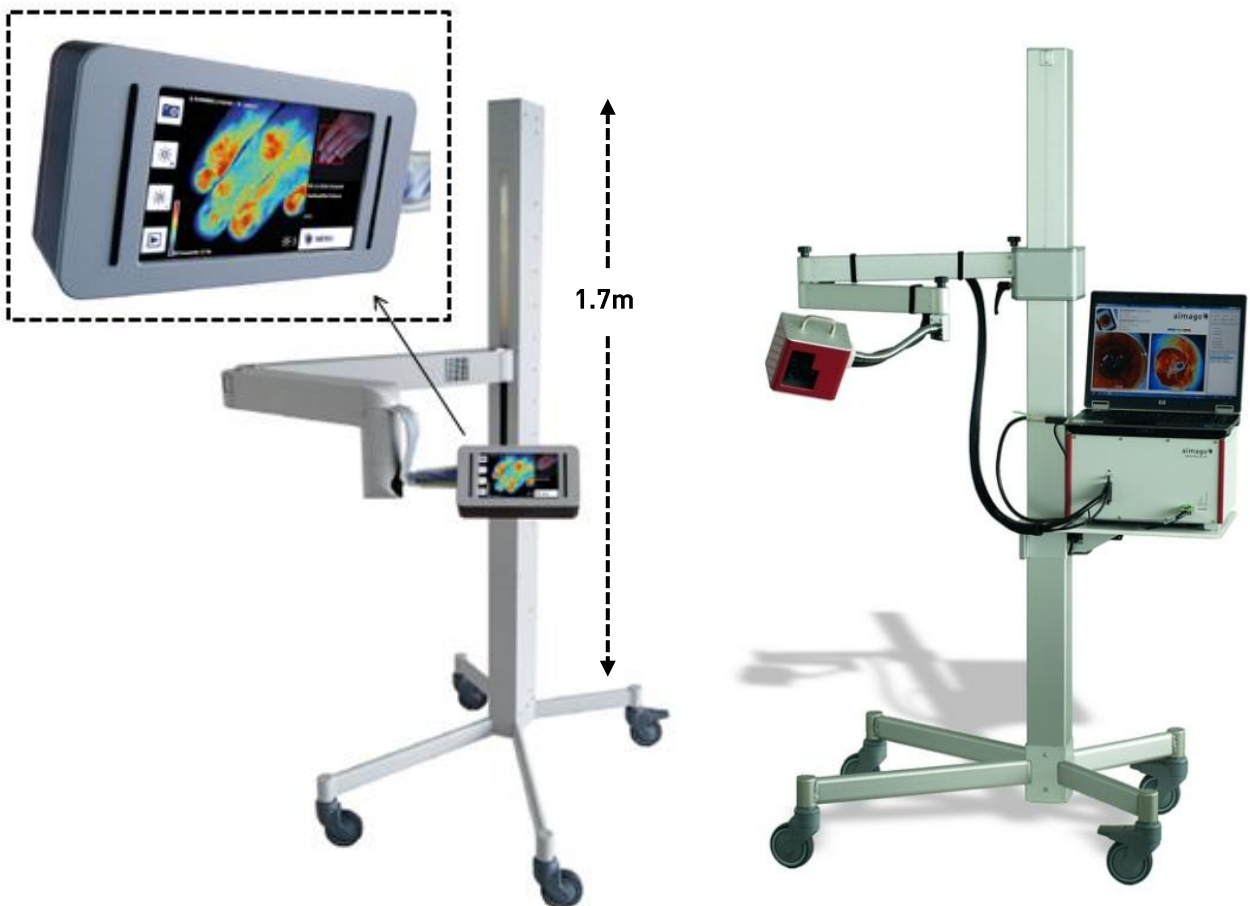
- **Speed:** Compared to other LDF devices that require several minutes to acquire one image, our cameras provide **up to 25 images per second**. This:
 - Eliminates movement artifacts caused by heartbeat, breathing & patient movement
 - Allows for dynamic imaging of pulsatile changes in microcirculatory perfusion, including phase delays or changes in pulse profile
- **Ease of use:** Due to the compact design concept as well as the positioning aid, the instrument can be used like a classical digital camera, thereby making the device natural to use by physicians, nurses or other health professionals
- **Functional/metabolic dynamic imaging:** By combining microcirculation imaging with patient stimulation (occlusion, temperature, drugs) and subsequent image processing, functional and metabolic parameters can be assessed

EasyLDI

- CE marked for **clinical use** by medical professionals
- Visualize perfusion in real-time at 12 fps
- Record LDIs and color photos

ResearchLDI

- Designed for **(pre-)clinical research**
- Record images and videos at up to 25 fps
- Post-processing image analysis (histograms, define ROI's, time series)



REFERENCES

- A. Raabe, D. Van De Ville, M. Leutenegger, A. Szelényi, E. Hattingen, R. Gerlach, V. Seifert, C. Hauger, A. Lopez, R. Leitgeb, M. Unser, E. J. Martin-Williams, and T. Lasser, *Laser Doppler imaging for intraoperative human brain mapping*, *Neuroimage*; 44(4), 1284–1289 (2009).
- M. Leutenegger, E. Martin-Williams, P. Harbi, T. Thacher, W. Raffoul, M. André, A. Lopez, P. Lasser, T. Lasser. *Real-time full field laser Doppler imaging*. *Biomedical Optics Express*;2(6):1470-7 (2011).