**BAOMS Endowments Grant Report**



Name: Mr Richard Pilkington, Dr Akhil Kallepalli

Title of project: **Cross-centre and collaborative pilot research study to investigate quantitative assessment of blood perfusion in free flaps and grafts**

Endowment meeting when grant was awarded: 23 March 2021

Date endowment grant was paid: 28 June 2021

£7243.00

Money spent to date (include separate receipts and brief
details on how the money has been spent):

£2566.00

Endowment grant money remaining:

Progress report: Include results obtained to date, the timescale for completion. (Max 500 words – this will be pasted onto the BAOMS website (please do not include any personal contact details in your report)
Please also email to office@baoms.org.uk):

The research set out to understand light transport through ischaemic tissue and find accurate markers for reduced perfusion in free flaps and grafts. The research has resulted in a better understanding of light transport in ischaemic tissue (BJOMS research article), with these results presented for BAOMS Annual Scientific Meeting 2022 (not accepted). The funding has supported other research such as developing novel light sources (to be used in the proposed point-of-care device). In the final stages of this funding term, we are putting together a kit (consisting of 2-3 optical fibres, 1 camera, 1 light source and ~ 2-3 lenses) in a form factor that can be placed on a trolley with a hand-held measuring device. This kit will be tested in the South Tyneside and Sunderland NHS Foundation Trust, Sunderland.

# Challenges:

* COVID-19 delays
* Honorary research contract delays
* Global supply chain issues, especially with significant 1+ year delays for computational devices and equipment.

# Next Steps

* Building an imaging and optical fibre-inclusive demonstration/kit that is portable with a light source, a camera and collection fibres.
* Remaining budget to be spent on building the demonstrator to convert research knowledge and findings into a portable, proof-of-concept device.
* Attending procedures and discussions at the Sunderland NHS Trust, putting in place the mechanism to translate/test techniques in the hospital (previously delayed due to COVID and procedural delays).
* Data collection (*beyond the scope of the endowment fund*) across multiple skin types and body locations to build up sufficient data and information for clinical applications.
* Scoping and securing additional research funding requiring equipment, prototyping and staff (*beyond the scope of the endowment fund*).

# Timescale for Completion

* March-May: Hospital visits
* May-June: Demonstrator construction
* June-end: Experimental data collection

Presentations, abstracts and publications to date (if none, indicate the likely timescale for submission of papers/abstracts for publication):

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| **Current / Published / Completed** |
| Research Article, BJOMS([Link](https://doi.org/10.1016/j.bjoms.2022.03.004)) *BAOMS Funding Role:* ***Primary*** | Main M., Pilkington R. J. J., Gibson G. M., Kallepalli A., Simulated assessment of light transport through ischaemic skin flaps. British Journal of Oral and Maxillofacial Surgery 60(7). 2022; DOI: 10.1016/j.bjoms.2022.03.004. |
| Conference Poster, Photon 2022, Nottingham(<https://www.photon.org.uk/>) *BAOMS Funding Role:* ***Supporting*** | Main M., Pilkington R. J. J., Gibson G. M., and Kallepalli A., Assessing variable degrees of blood perfusion in ischaemic skin flaps and grafts. Photon 2022 (Nottingham UK) |
| Research Article, HardwareX ([Link](https://doi.org/10.1016/j.ohx.2022.e00385)) *BAOMS Funding Role:* ***Supporting*** | Gibson G. M., Archibald R., Main M. and Kallepalli A., Modular Light Sources for Microscopy and Beyond (ModLight). HardwareX 13(e00385). March 2023; DOI: 10.1016/j.ohx.2022.e00385 |
| Conference Proceeding, 2023 Optica Biophotonics Congress ([Link](https://www.optica.org/events/congress/biophotonics_congress/schedule/schedule_search/?searchtext=akhil&searchmode=allwords))*BAOMS Funding Role:* ***Supporting*** | Main M., Kallepalli A., Towards point-of-care diagnostics and monitoring of hypertensive episodes (A Monte Carlo approach). April 2023, Optica Biophotonics Congress (Vancouver, BC, Canada) |
| **Future Submissions** |
| Research article in Biomedical Optics Express (BOE)*BAOMS Funding Role:* ***Supporting*** | Main M., Cerezo-Sanchez M., Wolley O., Walton F., Gibson G. M., Heidari H., Padgett M. J., Kallepalli A., Reperfusion monitoring strategies at 1550 nm combining microfluidics and digital holographic microscopyDue for submission in March/April 2023, currently being drafted.  |
| Review article, BJOMS*BAOMS Funding Role:* ***Primary*** | Kallepalli A., Pilkington R. J.J., Optical techniques for post-operative care in oral and maxillofacial reconstruction surgeryDue for submission in approx. April – June 2023 |
| Conference Abstract, BAOMS Annual Scientific Meeting 2024*BAOMS Funding Role:* ***Primary*** | To be confirmed |