Letter of support: Zeiss (contact Arno Merkle)

Carl Zeiss X-ray Microscopy, Inc.
4385 Hopyard Road, Suite 100
Pleasanton, CA 94588-2758 USA
www.zeiss.com/x-raymicroscopy

Ph: +1.925.701.3600
Fx: +1.925.730.4952
micro@zeiss.com

Prof. P.J. Withers,
Henry Moseley X-ray Imaging Facility
The University of Manchester
Sackville Street
Manchester M1 3NJ
United Kingdom

ERC Advanced Grant Application: Correlative Tomography (CORREL-CT)

Dear Philip,

Thank you for sharing your proposal on Correlative Tomography. Inspired by your paper on Correlative Tomography in Sci. Reports in 2014 we have been working hard to integrate both X-ray and electron microscopy within a correlative workspace to make both the experimental acquisition of information for the same region of interest seamless between instruments but also to handle the collation and co-visualisation of the data. To this end we have developed the next generation of Atlas to enable a variety of correlative workflows (in 2D and 3D). For example, it can take 3D X-ray CT data as an input for locating regions of interest for further inspection with FIB-SEM tomography or cross-sectioning. Indeed following your work we have already made great progress in developing semi-automated correlative imaging workflows: (https://www.youtube.com/watch?v=FIHJN3mPxBI).

We will work with you in three key areas:

1) The development of nano and micro material test rigs for insertion in to X-ray and electron microscopy equipment to obtain materials performance data at region of interest scales
2) Improved workflows for more automated tracking of a submerged region of interest from one instrument to another and the collation of the multiple datasets thus obtained
3) Work with you on the development of complementary imaging modes, in particular the laboratory diffraction contrast tomography (DCT) method (alongside the Danish SME XNOVO) that enables crystallographic grain orientations to be imaged for the first time non-destructively in 3D in the laboratory.

Currently we fund two researchers in your lab in addition to the co-development and testing of the nanotest rigs and DCT technique. If you are successful with your ERC bid we would like to continue our work together in the areas highlighted above.

Specifically, for the continued development of correlative workflows, we would commit to pursuing a defined collaborative program to further the technique and applications development in this area. As part of this we offer the following:

- 3 visits for up to two UoM researchers to spend up to 2 weeks per visit with us in Pleasanton (travel expenses and accommodation to be covered by University of

Manchester), CA or, as available, another ZEISS location (e.g. Oberkochen) in order to obtain hands-on experience with Atlas 5 and the FIB-SEM and XRM systems situated there and to interact with ZEISS technical staff to make progress on the defined correlative experiments. This will include instrument- and application personnel time as needed to serve the objectives of the experiments.
Value: $62,000 ($2,400 cost per day)

- Regular project meetings (bi-weekly) via teleconference/WebEx with ZEISS technical staff to evaluate progress, plan experiments, and pursue an exchange of best known methods.
  Value: $20,000 (Assume 50 meetings over the course of 2 years, with a minimum of 2 ZEISS technical staff)
- A local UK-based project manager to periodically visit (~quarterly) to monitor the project and coordinate/facilitate access to resources.
  Value: $15,000
- As an existing part of our collaborative partnership, ZEISS have previously funded another PhD student (beyond the 2 researchers mentioned above), intended for start in late 2015, lasting for 3 years. The topic of study will be focused on both XRM *in situ* studies and pursuing efficient correlative pathways, as described by Prof. Withers in his efforts for CORREL-CT. This will provide significant additional benefit to the program.
  Value: $120,000

Total effective contribution: $217,000

We look forward to a successful collaboration and continuing to strengthen our existing relationship with regard to correlative tomography, and the positive scientific contributions this promises to bring in the years to come. I do hope you are successful.

Yours,

Arno P. Merkle, Ph.D.
Sr. Manager, Research Market Segments
Carl Zeiss X-ray Microscopy
Pleasanton, CA