

Brad Burkhart / Hendrik Ohldag, Ph.D.

Dr. Hendrik Ohldag, the team physicist, has worked at the Stanford Linear Accelerator (SLAC) for over 15 years. He focuses on the use of special x-rays generated by the SLAC synchrotron that accelerates electrons then makes them change direction. The thin beam of x-rays is diverted to his beamline station for his experimental investigations. The x-rays are used to study the magnetic properties of materials to a level 1000 times finer than a human hair. A Scanning Transmission X-Ray Microscope takes photos of the x-ray images & enlarges them to a scale humans can interpret. Magnetism is the source of data storage for computers. Dr. Ohldag & his team are focused on ways to speed up magnetic wave transmission to increase the capacity of new generations of magnetic information storage & processing devices.

Brad Burkhart, team artist, works in intuitively derived images that appear to inform social and scientific problem solving. He was inspired by the work of Leonard Schlain who wrote Art & Physics, where he put forth the premise that artistic expression precedes scientific discovery and verification. Mr. Burkhart begins by drawing random pencil lines on paper he then develops into finished sketches, which are then translated into his clay relief panels. Each piece tells a story that Mr. Burkhart believes is best discovered by groups of people coming to consensus to name it. Hence his pieces are usually named at group “naming sessions” or thru “name suggestion boxes” at his shows.

The Collaboration

Mr. Burkhart & Dr. Ohldag decided to collaborate in the following ways:
Mr. Burkhart would sketch in Dr. Ohldag’s lab while an active experiment was in progress then translate these sketches to clay reliefs.
Dr. Ohldag would comment on the sketches to see how they related to his work & summarize experiment results to see if sketching influenced them.
Dr. Ohldag would pick a sculpture to hang in his new lab UC Berkeley to see if it would influence his work. He also selected an unnamed sculpture to place in the Berkeley Lab staff lounge with a naming box for staff input.

Results

The experiment was very successful and proved for the first time that if materials

are made small enough magnetic waves can travel at 500 not 1 mile per hour. This is a breakthrough result!

Comments on the sketches by Dr. Ohldag:

Sketch #1: I find the order of the sketches surprisingly “intuitively” correct. An experiment is always about starting from a point of “chaos”. You are addressing a problem question that is looking for a new fresh viewpoint. And, there is competition, because other researchers do this as well. This sketch represents this well, like a mass start in a marathon; everyone tries to get ahead with their idea of how to solve the problem. And the sketch also represents the diversity of ideas as well. This process would have happened before your SLAC visit

Sketch #2: The race has started; everyone has designed their experiment & now comes the “sitting and waiting for results”. There is time to enjoy company, relax, snooze, or chat with a visiting artist. The sketch represents what we do as the experiment is run. But, there is uncertainty, like being in limbo between raging seas and butterflies. Will it work or will it not work? That is the question!

Sketch #3: Eureka! We got it! We are in heaven and we are dancing with & between the stars. What else can I say....

Sketch #4: This one is peculiar. It seems out of place compared to the others. But, it nicely summarizes the aftermath of planning, conducting, and concluding the experiment. Now it is time to analyze the data & extract details that got lost in the chaos of the time at the beamline. Papers are written that take forever & students move at the pace of turtles, while senior researchers prance around like pretty birds & tell everyone of the marvelous things we did. The answers only lead to new questions waiting for us outside of the safe waters.