

August 12, 1996

To whom it may concern,

I am writing to recommend Brett Kraabel to you as a candidate for a post-doctoral position in your laboratory. Kraabel did his thesis research under my direction. He was an unusually good student; independent and productive with excellent laboratory skills. I recommend him to you with absolute confidence that you will be happy with him.

Brett began working with us during his first year of graduate school; I recognized him early as a “hands-on” type of person with real strengths in the laboratory. He turned out to be a talented experimentalist capable of making the most difficult experiments appear almost routine!

Brett's efforts focused on studies of the time resolved spectroscopy of conducting polymers: sub-picosecond photoinduced absorption. He built quite a remarkable pulsed laser facility (CPM laser amplified by a TFR, etc. “white” light with pulse width of about 100 fs) which enabled these sophisticated experiments to be carried out accurately and reliably. These are demanding experiments that quickly separate out those with less than unusual skills and patience. Brett demonstrated that he could more than meet the challenge; he did beautiful and important work.

I call attention, in particular, to his work on “Ultrafast Photoinduced Electron Transfer from Semiconducting Polymers to C₆₀” which appeared in Chemical Physics Letters in 1994. By using the techniques of femtosecond excitation spectroscopy, Kraabel successfully time resolved the charge transfer process - a *tour de force* experiment and a remarkable achievement! This work had major impact on me; it is an important milestone for the field. He subsequently extended and broadened this work to include femtosecond photoinduced dichroism and the loss of polarization memory as a diagnostic of photoinduced charge transfer. These results were presented in his Phys. Rev. B paper in 1995. The sub-picosecond photoinduced absorption studies formed the core of his thesis.

Brett made important contributions to many other aspects of our research program. I call attention, in particular, to our manuscript which appeared in Science in August, 1994:

160 Femtosecond Optical Image Processor Based on a Conjugated Polymer

By using a machine architecture suited to the NLO properties of conjugated polymers (large third order NLO susceptibilities *plus* substantial two-photon absorption), ultrafast optical processors are possible. Brett and his colleagues successfully built a four-wave mixing optical correlator using an air-stable, processable, degenerate ground state conjugated polymer, poly(1,6-heptadiester), as the active NLO element. The continuously updatable processor correlates two 5,000 pixel images in less than 160 fs, achieving peak processing rates of 3×10^{16} operations per second – the fastest processing rate yet achieved.

The last project in his thesis was a time resolved study of intersystem crossing in a conducting polymer system. Again – world class work; in this case, the idea was his, and he did a skillful job of developing the idea into a finished piece of research.

Brett is far more than a “laser-jock”. He is an outstanding young physicist who thinks deeply about his work and about the implications of his results. In addition, he has demonstrated an interest in and a talent for materials and materials processing. He has the patience needed to solve such problems and the skill to find the solution. In addition, Brett has developed powerful skills in the area of computer simulation and data analysis.

Brett worked well either independently or as a member of a group. I gave examples of each above; the intersystem crossing work was an independent project; the femtosecond image processing study was a genuine group effort. He communicates well both in writing and orally. Writing manuscripts with him was always a pleasure. I also called upon him to help with sections of proposals; I was always satisfied with his response. His research talks (group meetings and at conferences) were always clear and well-prepared.

Let me comment about his work habits and perseverance. You know enough about the difficulty of the pulsed laser experiments that formed his thesis to understand; he worked hard, he worked long hours, and he got through the hard times when nothing seemed to go right.

Unfortunately, I have not kept up-to-date on his post-doctoral period in France (my fault entirely!). Thus, for insight into his accomplishments during this period, you will have to contact his research colleagues there.

In summary, Brett Kraabel is an outstanding young physicist/materials scientist with significant accomplishments. He is cooperative, smart, and always pleasant. I recommend him to you with confidence and enthusiasm. If you do not have an opening in your laboratory, perhaps you could suggest an alternative opportunity for him. I want to find him a position in a top-quality laboratory; he certainly deserves such an opportunity.

Signed by Pr. Alan J. Heeger
Nobel Prize in Chemistry, 2000