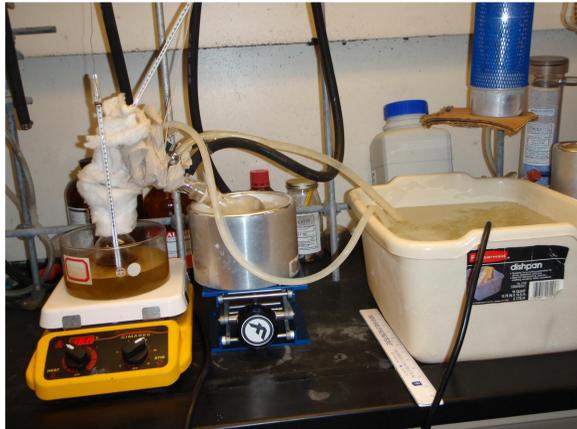


# Skills for Science

Dr. Aaron Sadow, KaKing Yan, Sadow Group Iowa State University, Ginny Elliott, Ray Simms, DOE ACTS Participants

KaKing Yan is working to synthesize alkali metal bulky silylalkyl complexes with Si-H functionality for yttrium carbon bond coupling reactions. Doing this requires many steps. I was able to take part in his research. Each step in the process of synthesis requires specific scientific skills.



Beginning of reaction to synthesize  $\text{CH}_2(\text{SiHMe}_2)_2$



Rotary Evaporator evaporates solvents according to boiling point and temperature



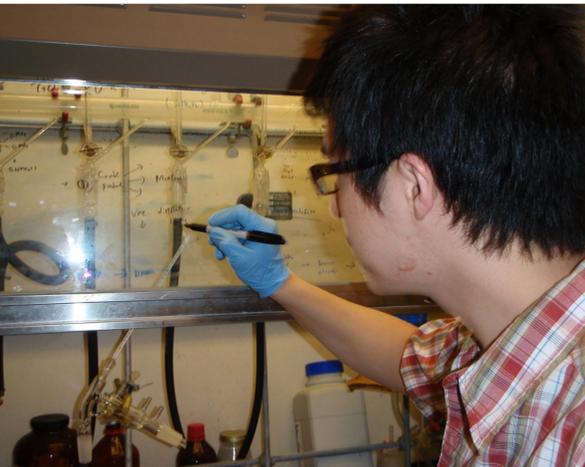
Working in the glovebox requires some practice but enables researchers to work in a controlled environment.



Keeping up with current literature is important to scientific research



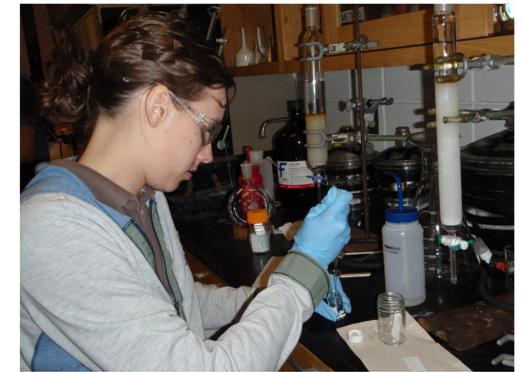
Flame-drying glassware



KaKing communicates and keeps track of progress with notation on the hood.



Separating water from solution



Using a column to separate the target compound from the impurities



Collaboration is an important part of scientific investigation

## Laboratory Skills Practiced

- Identifying lab equipment and supplies
- Using pipette technique to transfer non-air and sensitive materials
- Flame-drying glassware to thoroughly dry containers
- Reading pressure and temperature relation chart based on perfect gas law
- Combining materials to create a solution
- Transferred materials from one container to the other through vacuum transfer
- Vacuum distillation
- Using a column to separate target compounds
- Working in a glovebox
- Drying solutions
- Repeating a reaction to see if the same results may be obtained
- separating water from product
- Cooling solutions to various temperatures / safely warming solutions
- Using temperature as a clue to evaporation of specific substances.
- Observing safety procedures



## Results

My results for the time in the lab were an increased skill in using scientific tools with safety and accuracy. I have a much greater understanding of the skill, collaboration, repetition and documentation which goes into chemical synthesis.



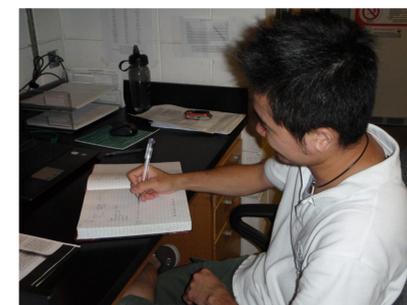
## Acknowledgements

I would like to thank Aaron Sadow for allowing us into his lab for our experience and making himself available for multiple questions. Thanks go to KaKing Yan for slowing up his research to explain things very carefully and clearly to us so we could feel as if we had a role in the process. Thanks for teaching us and then letting us do it ourselves. Thanks to the other members of the lab who were willing to help and answer questions if KaKing was not available.

Thanks also to Adah Leshem Ackerman and Ames Lab for organizing and sponsoring our program.



Separating the solution from the water



Keeping careful notes of what is done is vital for reporting results