

PureMadi 3 is returning to Alumni Hall on Friday, February 7<sup>th</sup>. Tickets and more info will be available at [www.PureMadi.org](http://www.PureMadi.org)

# PureMadi

*A lot of things have been happening, and a lot more is in the works. You can catch up with us here in our second annual newsletter!*

An Annual Newsletter

Issue 2 – 2014



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## PureMadi Teams with Rotary for \$38,000 Grant

*Fund will go towards factory improvements, training of the potters, and 1,100 filters*

PureMadi and the Mukondeni Cooperative have received a \$38,000 grant from the Rockingham County Rotary Club, the Kernersville, NC Rotary Club, the Louis Trichardt (South Africa) Rotary Club, and Rotary International. The centerpiece of the grant is funding to purchase and distribute over 1,100 filters to the rural communities of Tshibvumo, Tshapasha, Mashamba, and Mukondeni. In addition the grant provides funds for construction of covered concrete pads that will be used for drying clay and sawdust prior to filter manufacturing, continued training for the potters, supplies for water quality testing of the filters, and a small budget for marketing and sales.

The grant was awarded in June, 2013, and the PureMadi team, in concert with students and faculty

from the University of Venda and the Mukondeni potters, have already begun to implement the grant.

Fifty ceramic filters have been distributed to households in Tshibvumo and several thousand water samples have been collected for analysis. In addition, the Mukondeni Cooperative has been surveyed in preparation for future construction. The potters are working to produce the remaining filters for distribution to the villages.

## Crowd-Funding Support for PureMadi

University of Virginia Innovations selected PureMadi to be its first-ever project for support through a novel Crowd-Funding platform. This platform lets friends and alumni of the University of Virginia learn more about innovative research and service activities and donate to support activities of high interest. PureMadi's work in South Africa was selected as the first project for this new program.

UVA Innovations helped produce a three-minute video documenting our work. The video can be seen at the following link:

<https://uva.useed.net/projects/74/home>

89 supporters helped us raise over \$11,000 for PureMadi. These funds will be essential to starting our second filter factory in South Africa. Thank you to everyone who contributed to the success of this program!



**Erin Root (back to camera) meets with Louis Trichardt Rotary Club members and the Mukondeni Potters at the Cooperative to discuss project objectives.**



**The PureMadi Officers:** (l. to r.) Rebecca Kelly (President), Theresa Hackett (Vice President), Sydney Schrider (Secretary), Molly Tyeryar (Treasurer), and Rachel Schmidt (Technical and Cultural Coordinator). Each officer will serve a three-year term.

## PureMadi Re-Organization

PureMadi has begun working to establish itself as a separate legal entity from the University of Virginia Foundation. We have created a Board of Directors consisting of Dr. James Smith, Dr. Rebecca Dillingham, and Ms. Pamela Kelly. Dr. Smith is the Henry L. Kinnier Professor of Civil and Environmental Engineering at UVA and a PureMadi co-founder. He will serve as Chairman of the Board. Dr. Rebecca Dillingham is a physician and faculty member in the School of Medicine and Director of the Center for Global Health at UVA; she is also a PureMadi co-founder. For the past 27 years, Ms. Pamela Kelly has been a corporate finance attorney and was an adjunct professor at the UCLA School of Law for 10 years; she began her involvement with our work on water and health in Limpopo, South Africa in 2008.

This past summer, the Board selected Officers and PureMadi is happy to introduce these Officers who have agreed to a three year term: Ms. Rebecca Kelly (CLAS '13) will serve as President of PureMadi. Ms. Theresa Hackett (COMM '14) will serve as Vice President. Ms. Molly Tyeryar (CLAS '12), will serve as Treasurer. Ms. Sydney Schrider (SEAS '14), will serve as Secretary. Ms. Rachel Schmidt, (SEAS '12), will serve as the South Africa Technical and Cultural Coordinator. The Officers have been busy looking for a Liaison for the Filter Factory at Mukondeni, talking with an NGO in South Africa about building a second



**PureMadi Team members Thy Nguyen (left) and Chloe Rento listen to the technical program at PureMadi 2. PureMadi 3 is scheduled for February 7th, 2014 at Alumni Hall.**

filter factory in the village of Hammanskraal, and working on making PureMadi a stand-alone entity.

## PureMadi 2 a Huge Success

PureMadi 2 was a night to remember as over 200 attendees celebrated our second anniversary at Alumni Hall last February. The night was full of festive music performed by the Greg Howard UpTet and the Beleza Quintet. Between bites of authentic South African cuisine, many enjoyed bidding on beautiful artwork and various pieces donated to our silent auction. Attendees also had the chance to hear several PureMadi members discuss the project's progress and goals leading into the near future. Thanks to the generous support of those who attended and donated to the event, we were able to

raise over \$17,000! These donations not only funded additional research to refine the factory and filters but also provided each member of the Mukondeni Pottery Cooperative and several families from involved villages with filters for their households. Thanks again to all who attended and we hope to see you again at PureMadi III February 7th, 2014!

## Reflections on a Fulbright - Rachel Schmidt

During the last PureMadi newsletter, I was just two months into my nine-month Fulbright experience in Venda. Looking back on the entire thing – I can't believe it went so fast! Now, I'm living in Denver, working as a Water Resources Engineer and serving as the Technical and Cultural Coordinator for PureMadi.

Looking back on the nine months I spent in South Africa, I have a few take-a-ways I'd like to share...

*Patience and Perseverance* – nothing beats them! It takes patience to work effectively with anyone, especially coming from different backgrounds and cultures. Trying to explain or understand a new perspective can be tedious, but with perseverance any goal can be reached. Put the effort in to build a happy and effective team. Take a few moments to drink tea together every morning; these important moments help foster mutually beneficial relationships.

*Think holistically* – you've got to see the big picture. Not the tomorrow picture, or the next week picture, but the BIG picture. Define the big picture from day one and visualize the effects on yourself, your colleagues, project goals, partner attitudes, the community, and future endeavors. It's easy to get caught up in the details. In the end, the big picture is what matters, not the speed bumps along the way.

NOW I get it – On a more personal thread.... I learned a ton about myself through this experience. I've gained confidence in analytical skills, poise in my communication methods, and long lasting sense of respect and humility. I'll always hear the names "Rachelli-way!" and "Kaladzi!" ringing in my ears as great memories of my Venda experience.



# Keeping Up with Mukondeni

The Mukondeni Filter Factory has been developed by PureMadi in partnership with the University of Virginia, the University of Venda, Rotary International, and the 45 women potters of the Mukondeni Pottery Cooperative. The Mukondeni Potters have made great progress over the past year. Some of this progress is highlighted below.

We have helped the women potters to finalize and understand all of the technical steps required to create a functioning ceramic water filter. This includes grinding clay, sieving sawdust, using the electric mixer, pressing filters, firing to 900 °C, quality assurance testing, and applying silver nanoparticles. The potters are now fully capable of making high-quality ceramic water filters without our help.

We worked with different organizations who provided us with a variety of marketing and growth opportunities. We've developed image-based stickers and instructions, and are working to create Mukondeni billboards, business cards, and pamphlets outlining their products. Trudy Cole, a graphic design faculty member at James Madison University, is

working with us to develop an instructional brochure to go with each ceramic filter unit.

International partners have reached out to help the factory succeed. ACM Ministries has already ordered 200 filter units that will soon be shipped to Uganda. A European company (Howells Railway Products Ltd.) has fabricated and shipped us a new filter press. Rotary has provided a significant grant to support continued factory development (see story, page 1).

During summer 2013 a team of 16 students from UVA teamed with half a dozen students from UNIVEN to continue water and health research in Limpopo Province. Much of this work centered around evaluation of the technical performance of the ceramic filters manufactured by the Mukondeni Potters. Early data show the filters are performing at a very high level (see page 4 for more details).

Of course, our work is not without challenges. We had a few structural setbacks, a rainy summer, and some logistical confusion to work through – nothing we couldn't handle!

We're so excited to see where Mukondeni will go in the next year, with the assistance of all of our dedicated partners! Our next goals are to help the women consistently produce several hundred filters per month, sell them in nearby communities, and ship them efficiently.



Grace, fills a cup of water from the filter in her home. There are now over 500 PureMadi filters in use in South Africa.

# Grants from National Science Foundation and National Institutes of Health Drive Water-Health Research

PureMadi continues to leverage its activities with research funds from the University of Virginia (UVA) and its international partner, the University of Venda (UNIVEN). Two major grants from the National Science Foundation (NSF) and the National Institutes of Health (NIH) have provided important resources for our students.

The NSF has awarded the University of Virginia and the University of Venda a 3-year grant to support research experiences for undergraduates. During summer 2013, the first cohort of 8 students (selected from a national pool of 108 applicants) traveled to South Africa to conduct research at the intersection of water, societal, and human health disciplines. Their research included (i) field testing of the performance of ceramic filters manufactured at the Mukondeni Cooperative, MadiDrops, and MadiDrops plus filters in a total of 80 rural households, (ii) testing of silver-impregnated papers for water filtration and disinfection, and (iii) architectural design improvements for the filter factory.

The NIH has provided support for 15 postdoctoral researchers over the next 5



Students, postdocs, and graduate mentors with Chief Lucas in the village of Tshibvumo.

years to work at the water-health interface. The first four postdoctoral fellows have already been hired, beginning with Teri Dankovich, who recently completed her doctorate in Chemistry at McGill University.

Erin Root is the newest postdoctoral fellow, and she has been working on architectural design improvements for the filter factory. Over the 2013 summer, Erin and her team continued conversations with the Mukondeni potters to receive feedback on the evolving design. The team also developed their research on vernacular and

contemporary architecture within the region. With local South African architects and contractors, the team has developed a drawing set for project construction.

In addition to these federal resources, we have continued to receive annual support from the Jefferson Public Citizens Program at the University of Virginia and the Center for Global Health.

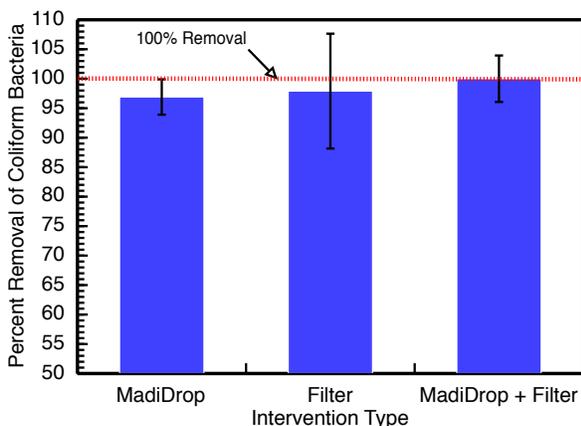
Research activities have involved faculty from both universities and a plethora of disciplines, including Nursing (M. Baernholdt, V. Netshandama, A. Thompson-Heisterman, M. Maluleke), Engineering (J. Smith, G. Louis, G. Learmonth, N. Swami, L. Colosi-Peterson), Medicine (R. Dillingham, R. Guerrant, J. Richardson, J. Plews-Ogan, M. Plews-Ogan), Microbiology (A. Samie, P. Bessong, N. Potgeiter), Hydrology (J. Odiyo), Environmental Sciences (J. Gumbo), Law (C. Hagenmeier), Chemistry (P. Mojapelo), Anthropology (C. Krizancic), Commerce (M. White), Rural Development (J. Mudau), and Architecture (A. Canfora, K. Firehock).

## The MadiDrop Goes Viral!

During the technical program during PureMadi 2 in February 2013, we introduced the MadiDrop, an entirely new point-of-use water treatment technology. Fariss Samarrai, a journalist at the University of Virginia, wrote a story about this new technology that was picked up by the Associated Press. Within a day, there were stories about the MadiDrop all over the world!

The MadiDrop is a ceramic tablet that has been infused with metallic silver and copper *nanopatches*. The MadiDrop is simply placed in a 10-20-liter water storage container, and over time, it releases trace amounts of ionic silver and copper into the water which disinfects waterborne pathogens such as *E. coli*, *Shigella*, and *V. cholerae*. It lasts for about 6 months and likely will only cost a few dollars.

During summer 2013, we tested the MadiDrop and the filters produced at Mukondeni both alone and in combination. As you can see from the bar chart, all three interventions were highly effective at improving water quality by removing coliform bacteria from the household water.



Percent removal (w/standard error) of coliform bacteria from water for three interventions in our field study of 80 homes in Mashamba and Tshibvumo, South Africa during summer 2013.

## Donate

To contribute to PureMadi, please visit [www.PureMadi.org](http://www.PureMadi.org) and click on our "Donate" link. All donations are fully tax deductible. PureMadi is operating as a 401(3)(c) not-for-profit organization under the umbrella of the UVA Fund managed by the University of Virginia Alumni Association. All donations go to PureMadi's activities in South Africa.

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