

# Wool research to enhance the competitiveness and prosperity of the U.S. sheep industry

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# Animal fiber research program

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- **Develop and evaluate improved procedures for measuring value-determining characteristics of animal fibers.**
- **Collaborate in research projects that require fiber production and quality to be quantified.**



# Animal fiber program

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- **We recognize the need to increase sheep and goat numbers before excessive infrastructure is lost.**
- **Develop technologies and / or animals capable of increasing producers' income.**

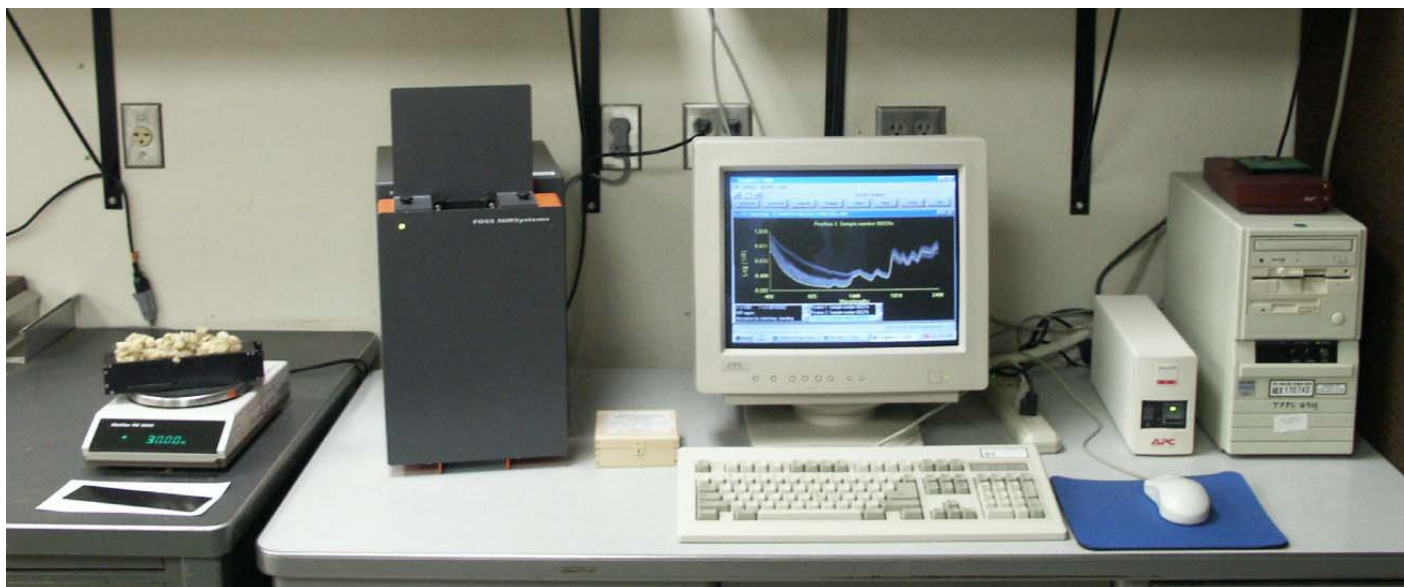
# Species we work with



**Muskox (qiviut), rabbit, dog, cattle, mice, *et al.***



# Current instrumentation focus



**NIRS**

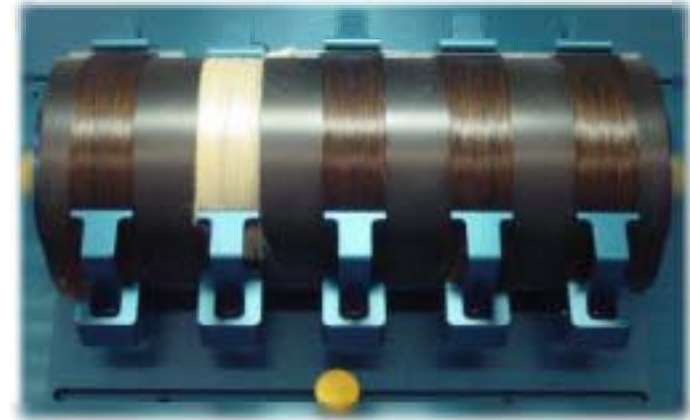


**2000**

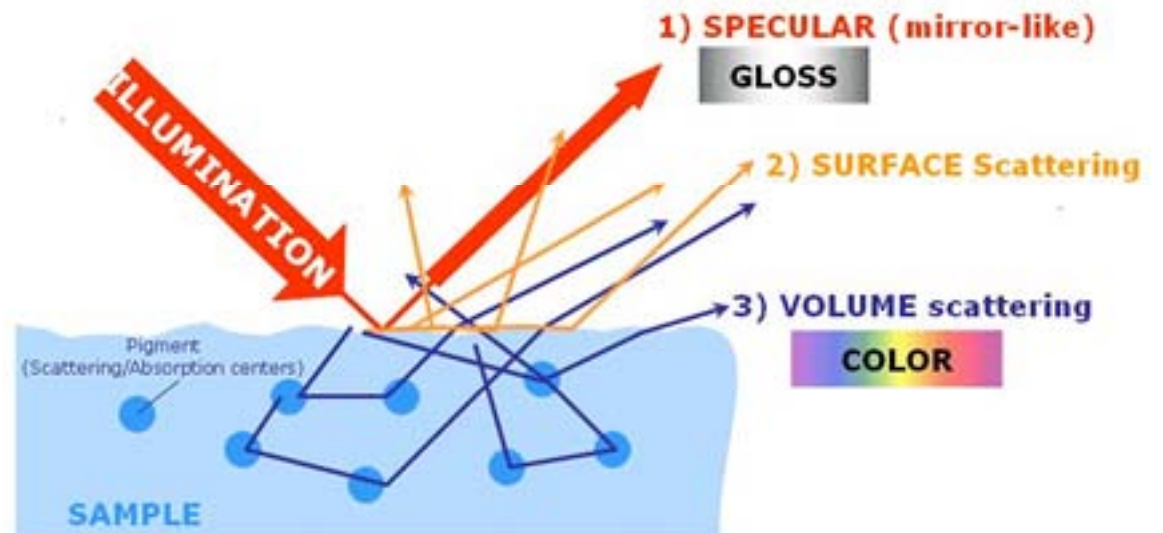
**Automatic image analysis, OFDA**



**100**



The SAMBA System (AIA)  
for measurement of fiber  
luster



# Predicting the Average Fineness of Bulk Lines of Fine Wool by Measuring One Mid-side Staple From Each Skirted Fleece in the Line With an OFDA2000





# **Incentive to make wool lines within specific AFD ranges?**

- **Actual wool price differentials**
- **USDA Wool Loan and LDP rates**

# Current Loan, LDP, and Repayment Rates, \$/lb clean (1/7/09 to 1/13/09)

	<b>&lt; 18.6 microns</b>	<b>18.6 to 19.5</b>	<b>19.6 to 20.5</b>	<b>20.6 to 22.0</b>
<b>Loan rate</b>	<b>5.27</b>	<b>3.38</b>	<b>2.45</b>	<b>2.24</b>
<b>LDP rate</b>	<b>2.33</b>	<b>0.88</b>	<b>0.45</b>	<b>0.30</b>
<b>Repayment rate</b>	<b>2.94</b>	<b>2.50</b>	<b>2.00</b>	<b>1.94</b>

# OFDA2000

- **Designed to measure fiber diameter (and other traits) of greasy wool (usually side samples) under variable conditions of temperature and humidity.**
- **Greasy correction factor for a specific flock based on average grease content determined on first 20 to 30 wool samples measured.**

## OFDA2000

- **Montana State University, Bozeman, Rodney Kott**
- **PMCI, San Angelo, Ronald Pope**
- **Texas AgriLife Research, San Angelo, Chris Lupton**
- **University of California, Davis, Martin Dally**
- **University of Nevada-Reno, Tumen Wuliji (Hudson Glimp)**
- **University of Wyoming, Laramie, Bob Stobart**

# OFDA2000

- **Our commitment to ASI:**
- **Assist wool producers with **sheep selection** and **wool marketing** by measuring at least 5000 wool samples for at least 20 producers (not including University flocks) charging only a nominal fee (no charge for machine).**
- **Conduct research using the instrument.**

# Procedure

- **Measure sheep, preferably several days before shearing.**
- **Ear tag and/or mark sheep according to AFD for easy sorting (typically 3 groups).**
- **Shear and skirt fleeces. Package according to measured AFD (by-passing traditional classer except for short or tender fleeces, for example).**

# Procedure (contd.)

- **Core sample individual lots and measure at commercial wool testing lab.**
- **Compare predicted with actual results.**

# Predictions made using the following assumptions:

- ✓ OFDA2000 provides a reasonably accurate measurement of side sample.
- ? The mid-side AFD is an accurate predictor of the whole fleece AFD.
- ✗ All skirted fleeces weigh the same.



## Results (< 18.6 $\mu\text{m}$ group)

Predicted	Actual	P-A	No. bales
17.2	18.3	-1.1	4
17.3	17.5	-0.2	6
17.4	18.2	-0.8	6
17.4	18.1	-0.7	2
17.5	18.2	-0.7	6
17.7	18.9	-1.2	5
17.7	18.9	-1.2	2
18.5	19.2	-0.7	7
18.5	18.6	-0.1	3

## Results (< 18.6 to 19.5 $\mu\text{m}$ group)

Predicted	Actual	P-A	No. bales
18.6	19.0	-0.4	3
18.6	19.1	-0.5	7
18.8	18.6	0.2	4
19.1	19.4	-0.3	1
19.3	19.8	-0.5	2
19.3	19.6	-0.3	6
19.4	18.9	0.5	3
19.5	19.5	0.0	2
19.5	20.0	-0.5	8

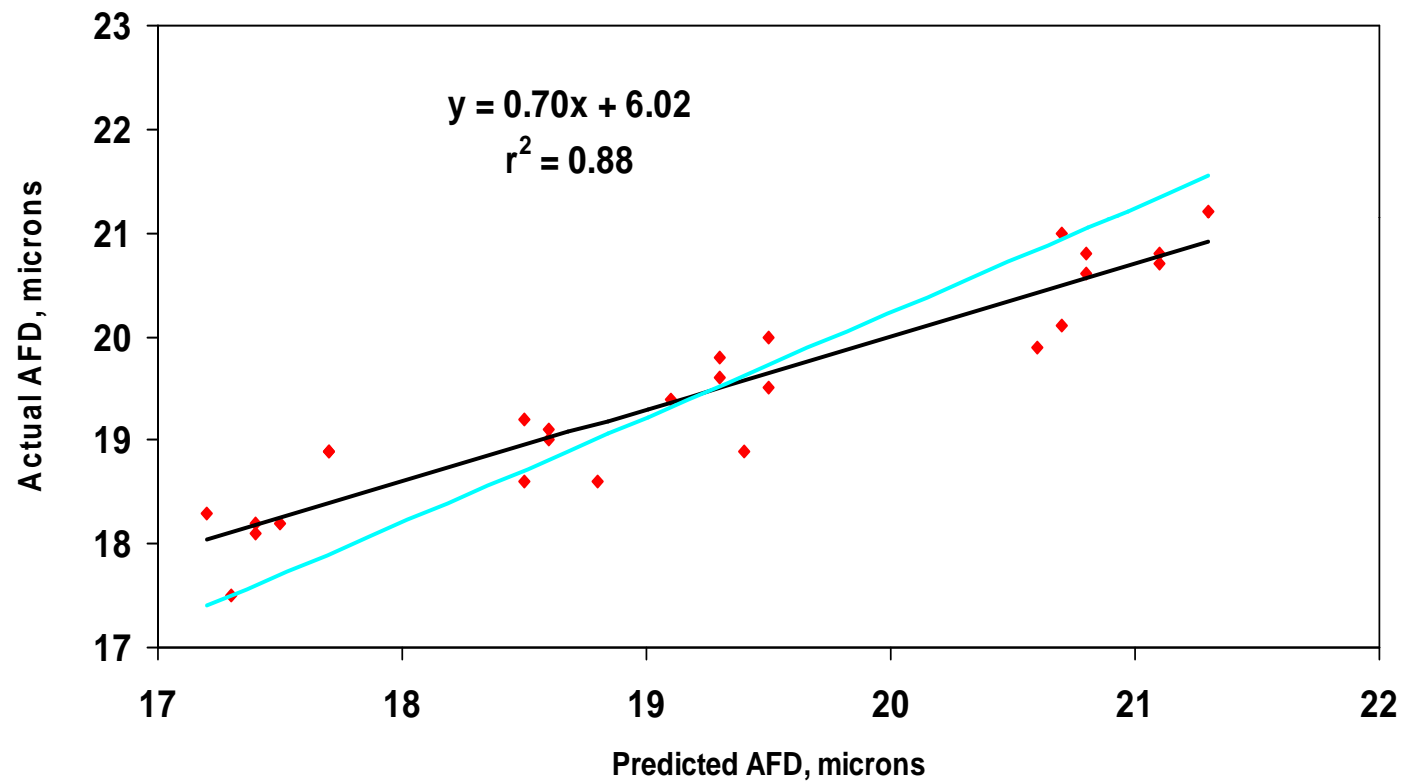
## Results (19.6 and > $\mu\text{m}$ group)

Predicted	Actual	P-A	No. bales
20.6	19.9	0.7	4
20.7	21.0	-0.3	9
20.7	20.1	0.6	2
20.8	20.6	0.2	39
20.8	20.8	0.0	1
21.1	20.8	0.3	6
21.1	20.7	0.4	2
21.3	21.2	0.1	3

# Results

- Overall, Actual AFD  $>$  Predicted AFD, 0.25  $\mu\text{m}$ ,  $P=0.02$ .
- SE of y estimate (Actual AFD) = 0.35  $\mu\text{m}$ .
- Range in (Predicted – Actual AFD) was –1.2 to 0.7  $\mu\text{m}$ .

# Predicted versus actual average fiber diameter of instrument classed bulk wool lines



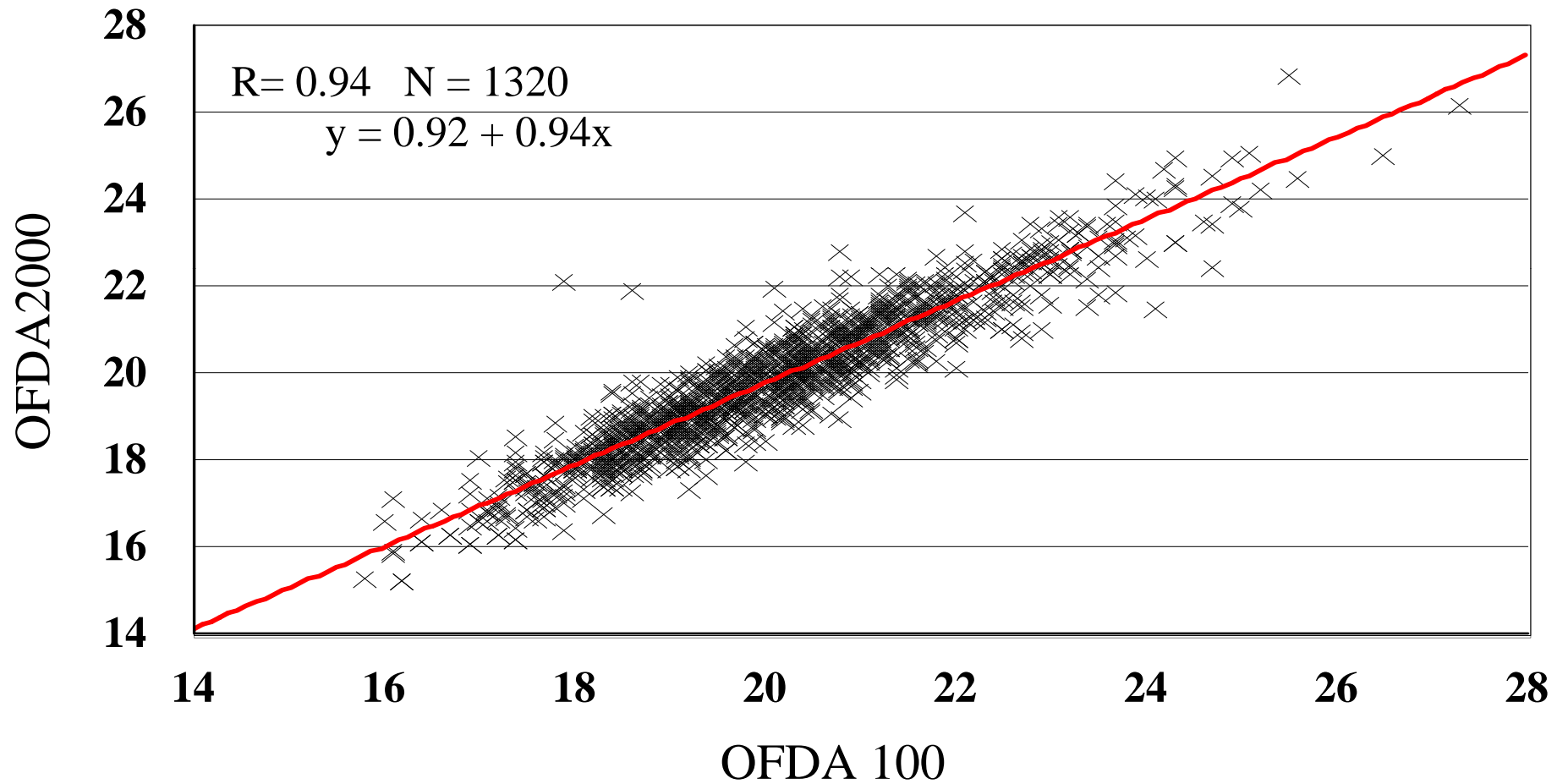
# Conclusions

- **For the fine-wool flocks we worked with in West Texas, the method we used with the OFDA2000 proved to be a somewhat unreliable predictor of fiber diameter of instrument-classed wool lines.**
- **The accuracy of prediction varied considerably among clips.**
- **Weighing individual skirted fleeces would likely produce more accurate predictions.**

## **Major Study: Australian Wool Innovation, May 2004**

- **Biases were observed between on-farm classing predictions (OFDA2000 and Fleecescan) and Certified Test results in the range  $-1.1$  to  $+0.9$  microns. Magnitude of bias was different for each property.**

# Field versus lab measurements





# Previous Conclusion (most OFDA2000 users)

- **The OFDA 2000 is an excellent tool for selection of sheep based on wool average fiber diameter.**

# Breed and crossbreed evaluations

- **Comparison of Texas Rambouillet with Merino x Rambouillet crosses.**
- **Central performance tests for fine-wool (mainly Rambouillet) rams .**



# Selection and breed evaluation

- **Texas Rambouillet Superior Genetics**



- **Dorper versus Rambouillet for lifetime lamb production**



- **Comparison of Meat vs Angora goats and Hair vs Rambouillet sheep in an extensive range environment**



# Nutrition experiments

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- Evaluation of the nutritional and feeding value of juniper and distiller's dried grains in lamb feedlot rations.
- **Fiber component** in each of these projects

