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## How Advanced Reproductive Technologies (ART's) are Changing our Industry and Your Employment Opportunities.

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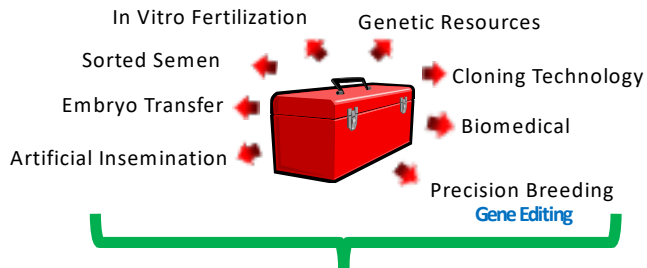
## Forward-Looking Statements

Some of the statements made in this presentation are forward-looking statements. These forward-looking statements are based upon our current expectations and projections about future events and generally relate to our plans, objectives and expectations for the development of our business. Although management believes that the plans and objectives reflected in or suggested by these forward-looking statements are reasonable, all forward-looking statements involve risks and uncertainties and actual future results may be materially different from the plans, objectives and expectations expressed in this presentation. All information in this presentation is as of the date marked on the cover page, and Trans Ova Genetics undertakes no duty to update this information unless required by law.

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## The Toolbox



In Vitro Fertilization    Genetic Resources

Sorted Semen    Cloning Technology

Embryo Transfer    Biomedical

Artificial Insemination    Precision Breeding  
Gene Editing

**Animal Husbandry**

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## Why use ART?

Assisted reproduction tools coupled with genomic enhanced selection will accelerate:

**genetic gain 2X – ?X**

AI started in 1950's  
ET started in mid 1970's  
IVF started in 1990's  
Cloning started in late 1990's  
SS started in 2000's





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Embryo Transfer – *in vivo, in vitro*

ET allows you to increase the genetic impact of superior females.



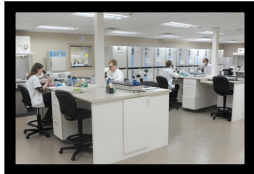

More than one calf per year out of those really good cows.



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Today's Elite Genetic Selection



1) Qualify donors via high density genomic chips-GPTAs

2) Collect juvenile donors

3) IVF with sexed/conventional semen



4) Gestate all embryos-Generation interval

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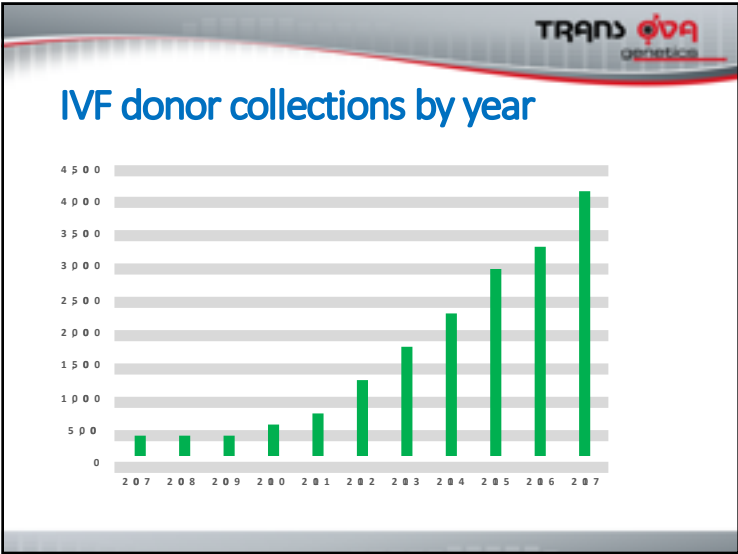
Our Platforms Today Enables Superior Genetic Gains

Genetic Gain  
(Daughters with more milk, health and longevity)

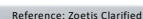
$$\text{Genetic Gain} = \frac{\text{Accuracy} \times \text{Genetic Variation} \times \text{Selection Intensity}}{\text{Generation Interval}}$$



Confidential





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A black and white cow, likely a Friesian, stands in a stall. The stall has a concrete wall and a wooden door. The floor is covered with straw bedding. The cow is facing left and has a yellow tag on its ear.

## Future Beef Industry

- Generation interval - younger animals? **Genomic accuracy**
- Genetic landscape changing? **In time?**
- Leveraging commercial data like the dairy industry?
  - Larger progeny tests with detailed data?
- Impact of technology in commercial sector increases?
  - Genetic products i.e. custom made replacements

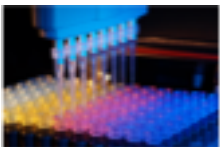
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## Future Beef Industry




- **Targeted Genetics** for consumer driven products- Food Companies
- **Vertical integration** of conception to consumption
  - Different than Poultry, Swine and Dairy?
- Management and Genetics - **G x E** understanding
- Have to understand the **"whole"** of production Ag

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## Careers - What doors will open?



- Horned and Polled Hereford
- Herdsmen- Kilgore, NE
- Purebred Manager, Dunlap IA
- Graduate Student- UNL mouse models
- USMARC
- Pfizer Animal Health Genetics
- Trans Ova Genetics

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## Careers - Opportunities

- Scientists
- Data analysts
- Animal management specialists
- Husbandry
- Consulting- expanding
- Management groups
- Genetic
- Nutrition

Key- understanding how to successfully communicate and work/manage (lead)/be managed (lead) -Inspire

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