South Texas-Coastal Bend STEM Coalition
Fall-2011 Meeting
Texas A&M University-Kingsville, Gross Hall, 110
September 30, 2011

Javelina STEM Summer Program

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Tamara D. Guillen, Amanda Remlinger
Texas A&M University-Kingsville (TAMUK)
Outline

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  - Projects
  - Camp Items
  - Sample Final Survey Results and Testimonials

- **ESF Camp**
  - Schedule
  - Projects
  - Camp Items
  - Sample Final Survey Results and Testimonials

- **Conclusions**
Introduction - Overview

- **STEM Camps:**
  - Proven effective to attract and expose students to STEM disciplines
  - Access to research opportunities
  - Some offer college credit to participating students
  - Access to possible overnight stay, i.e., residential camps
  - Various camp focus such as specific gender/minority/grade level, minimum grade point average, camp fee, special topics such as rocketry

- **Javelina STEM Summer Program:**
  - **Three Camps:** YESTexas, GEMS, ESF (effectively covered South Texas-Coastal Bend Area)
  - **Goal:** Attract (and retain) high school students to STEM disciplines via diversified STEM projects with no major eligibility constraint for applicants
  - Hosted by the Texas A&M University-Kingsville (TAMUK),
    - A Hispanic serving institution in an underserved region with 65% Hispanic population
  - Sponsored by Texas Workforce Commission (TWC) and Texas Higher Education Coordinating Board (THECB)
  - **Project Team:** Dr. Muhittin Yilmaz (PI), Dr. Carlos Garcia (co-PI), Dr. Nuri Yilmazer (co-PI), Dr. Mais Nijim (co-PI), Amanda Remlinger (Camp Assistant), Tamara Guillen (Camp Assistant Supervisor)
- **Young Engineers of South Texas (YESTexas)**
  - A comprehensive outreach camp
  - Hands-on STEM related projects, documentation and competitions
  - Open to all 14-21 year old Texas middle-high school students
  - University admission, financial aid, housing and STEM departmental presentations, parent campus tour
  - http://www.engineer.tamuk.edu/yest/index.html

- **Girls in Engineering, Manufacturing and Science (GEMS)**
  - Girls-Only comprehensive outreach camp
  - Hands-on STEM related projects, documentation and competitions
  - Open to all 14-21 year old Texas middle-high school students
  - University admission, financial aid, housing and STEM departmental presentations, parent campus tour
  - http://www.engineer.tamuk.edu/gems/

- **Engineering & Science Frontiers (ESF) Summer Camp**
  - Hands-on advanced research camp
  - Continuation of YESTexas and GEMS Camps
  - By invitation-only, i.e., open to students who attended a previous YESTexas or GEMS camp
  - One week-long STEM-related research project for each student team, based on preferences of students and project availability
  - University admission, financial aid, housing and STEM departmental presentations, parent campus tour
  - http://www.engineer.tamuk.edu/esf/index.html#Esf
Program Admission – YESTexas, GEMS and ESF

- **YESTexas and GEMS camp applications were handled together:**
  - Recruitment: Camp fliers, school presentations, email notices via ESC-1 and ESC-2, etc.
  - Standard camp application form with funding agency requirements and selection process enhancement
  - Hardcopy or online application forms

- **ESF camp applications were handled separately:**
  - Invitational-only based recruitment eligible students
  - Project selections based on student preferences and availability

- **Application Scoring Metric:**
  - Core-subjects GPA: science, mathematics, English, History
    - GPA 70-79: 20 points
    - GPA 80-89: 35 points
    - GPA 90+: 50 points
  - School attendance record
    - 0-3 Absences: up to 25 points
    - 4-6 Absences: up to 15 points
    - 7 or more Absences: up to 5 points
  - A short essay: Organization, Syntax, Following the directions, Educational objectives
    - Number of Elements | Points
    - 4 Elements | up to 25 points
    - 2-3 Elements | up to 15 points
    - 1 Element | up to 5 points
**YESTexas Summer Camp (July 11-15, 2011)**

- Eight student teams based on diversity and comparable grade levels
- Breakfast, morning/afternoon snacks and lunch breaks
- 8 Faculty members, 10 graduate assistants, 4 chaperones, 3 staff assistants
- 28 high school students:
  - Hispanic (18), Non-Hispanic or Latino (7), No response (3)
  - Female (2), Male (26)
  - Freshman (7), Sophomores (1), Juniors (11), seniors (6), Not reported (3)
  - Age distribution: Fourteen (7), fifteen (2), sixteen (10), seventeen (8), not reported (1)

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<td>Student Evaluation of teams and the program</td>
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Four engineering projects (3-hour sessions with competitions)
- Bridge Building (Civil)
- Computer Architecture and Bluetooth (Electrical)
- Groundwater Quality (Environmental)
- Robotics (Mechanical)

Four engineering activities (2-hour sessions)
- Air Pollutant Measurements (Environmental)
- Discover the Product Recycle Value (Industrial)
- Hydrate Reservoir Simulator (Chemical)
- Hydrostatic Measurements (Civil)
An industry site visit
- Real world experience at the Navy-Air Station of Kingsville engineering operations
- Safety principles and regulations, professional engineering operations and extensive interactions with all levels of the port personnel

Luncheon discussions
- Interactions with a number of STEM professionals and college students
- Discussions on the nature, requirements and perspectives of professional engineering careers as well as college life
- Parents/guest speaker invitation to the Friday lunch

TAMUK financial aid, housing, admission and STEM departmental presentations and a campus tour for parents

Competitions:
- Poster presentation judging by qualified external faculty/staff
- Notebook judging by the camp faculty/graduate assistants

Two different surveys:
1. Daily camp evaluations: Satisfaction ranking for written questions and possible comments, assess camp execution efficiency, locate/correct potential problems promptly for smooth camp execution, provide insight for future camps
   - Six key questions: How satisfied are you with today’s overall camp experience? How satisfied are you with today’s snacks and lunch? How satisfied are you with today’s guest speakers?, How satisfied are you with today’s technical activity? How satisfied are you with today’s engineering projects? What would you like to see improved in the quality of today’s experience?

2. Final camp survey:
   - Many questions to evaluate the effectiveness and outcomes of the camp
   - Some questions required by the sponsoring agency
What attracted you to YESTexas (Check all that apply)
The educational experience (20)
The prizes (12)
The opportunity for hands-on training/research (17)
Other (4): engineering learning, as a guide for my career, group projects, engineering

Because of my participation in YESTexas, I would like to pursue a degree in:
Engineering (21)
Chemistry (6)
Mathematics (4)

Because of my participation in YESTexas, my skills in the following have improved. (Check all that apply)
My writing skills (5)
My oral presentation skills (13)
My teamwork skills (23)
My documentation skills (12)

The information provided by the Admission Office will be helpful when applying to college.
Strongly Agree (8)
Agree (19)
Disagree (1)
Strongly Disagree (0)

Although the projects were challenging, my faculty mentor(s) provide clear instructions so that I was able to understand what was expected of me and my teammates.
Strongly Agree (15)
Agree (13)
Disagree (0)
Strongly Disagree (0)

The field trip to NAS-Kingsville was very educational and informative.
Strongly Agree (16)
Agree (10)
Disagree (2)
Strongly Disagree (0)

Since my participation in YESTexas:
I have decided on a degree program (17)
I am still undecided on a degree program (11)

“Well from this camp I have experienced different kind of engineering how it fell likes working in project of those degrees.”

“It helped me decided my major it was fun. I made new friends. Thank YOU”
GEMS Summer Camp (July 18-22, 2011)

- Eight student teams based on diversity and comparable grade levels
- Breakfast, morning/afternoon snacks and lunch breaks
- 8 Faculty members, 11 graduate assistants, 4 chaperones, 3 staff assistants
- 21 female high school students:
  - Hispanic (13), Non-Hispanic or Latino (5), No response (3)
  - Freshman (7), Sophomores (6), Juniors (2), seniors (3), Not reported (3)
  - Age distribution: Fourteen (9), fifteen (5), sixteen (3), seventeen (2), eighteen (1), not reported (1)

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Four engineering projects (3-hour sessions with competitions)
- Solar Energy (Environmental)
- Robotics (Mechanical)
- Health Effects of Air Pollution Exposure (Biology)
- Introduction to CAD/CAM (Industrial)

Four engineering activities (2-hour sessions)
- Groundwater Quality (Environmental)
- Computer Architecture and Bluetooth (Electrical)
- Discover the Product Recycle Value (Industrial)
- Hydrate Reservoir Simulator (Chemical)
GEMS – Camp Items

- An industry site visit
  - Real world experience at the Navy-Air Station of Kingsville engineering operations
  - Safety principles and regulations, professional engineering operations and extensive interactions with all levels of the port personnel

- Luncheon discussions
  - Interactions with a number of STEM professionals and college students
  - Discussions on the nature, requirements and perspectives of professional engineering careers as well as college life
  - Parents/guest speaker invitation to the Friday lunch

- TAMUK financial aid, housing, admission and STEM departmental presentations and a campus tour for parents

- Competitions:
  - Poster presentation judging by qualified external faculty/staff
  - Notebook judging by the camp faculty/graduate assistants

- Two different surveys:
  i. Daily camp evaluations: Satisfaction ranking for written questions and possible comments, assess camp execution efficiency, locate/correct potential problems promptly for smooth camp execution, provide insight for future camps
     - Eight key questions: How satisfied are you with today’s overall camp experience? How satisfied are you with today’s snacks and lunch? How satisfied are you with today’s guest speakers?, How satisfied are you with today’s technical activity? How satisfied are you with today’s engineering projects? How satisfied are you with the faculty, staff and graduate assistant performance today? How satisfied are you with the performance of your team chaperone? What would you like to see improved in the quality of today’s experience?
  
  ii. Final camp survey:
     - Many questions to evaluate the effectiveness and outcomes of the camp
     - Some questions required by the sponsoring agency
What attracted you to GEMS (Check all that apply)
The educational experience (13)
The prizes (7)
The opportunity for hands-on training/research (17)
Other (6): see what engineering is all about, I wanted to see what field I can go for my future, social, to understand what an engineer is, I was not sure of my future, I thought it would be fun to do for summer

Because of my participation in GEMS I would like to pursue a degree in:
Engineering (14)
Chemistry (3)
Mathematics (1)
Other (5)

Because of my participation in GEMS, my skills in the following have improved. (Check all that apply)
My writing skills (3)
My oral presentation skills (10)
My teamwork skills (19)
My documentation skills (10)
None of the above (2)
Other (1): In research

The information provided by the Admission Office will be helpful when applying to college.
Strongly Agree (10)
Agree (9)
Disagree (1)
Strongly Disagree (0)

Although the projects were challenging, my faculty mentor(s) provide clear instructions so that I was able to understand what was expected of me and my teammates.
Strongly Agree (8)
Agree (11)
Disagree (0)
Strongly Disagree (2)

The field trip to NAS-Kingsville was very educational and informative.
Strongly Agree (15)
Agree (5)
Disagree (0)
Strongly Disagree (0)

Since my participation in GEMS:
I have decided on a degree program (11)
I am still undecided on a degree program (10)

":)"

":)"
ESF Summer Camp (July 25-29, 2011)

- Eleven student teams based on diversity and comparable grade levels
- Breakfast, morning/afternoon snacks and lunch breaks
- 11 Faculty members, 12 graduate assistants, 5 chaperones, 3 staff assistants
- 24 high school students:
  - Hispanic (16), White (5), Asian/Pacific Islander (2), American Indian/Alaskan Native (1)
  - Female (14), Male (10)
  - Freshman (3), Sophomores (9), Juniors (10), seniors (1)
  - Age distribution: Fourteen (1), fifteen (6), sixteen (11), seventeen (5), eighteen (1)

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<td>Award Ceremony &amp; Dismiss</td>
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Seven advanced engineering research projects

- Sustainable Manufacturing and Energy Savings Product Design (Industrial)
- Citrus Waste Conversion to Bio-fuels and Chemicals (Chemical)
- Antenna Design for Wireless Communications Systems (Electrical)
- Programming a Four-wheel Drive Mobile Robot with 4-Degrees of Freedom Robotic Arm (Mechanical)
- Design of a Truss System (Civil)
- Air quality (Environmental)
- Influence of Surface Roughness on Wear and Corrosion Performance of Implants via a Nano-scale Approach (Mechanical)

Four advanced STEM-related science research projects

- Impact of in Vivo Ozone in Human Health (Biology)
- Monitoring Ice Front Retreat of Antarctica as Climate Indicator (Geo-Science)
- Mobile Applications Programming (Computer Science)
- Creating Storage Systems in the Cloud (Computer Science)
An industry site visit
- Real world experience at Kiewit Offshore Services engineering operations
- Safety principles and regulations, professional engineering operations and extensive interactions with all levels of the port personnel

Luncheon discussions
- Interactions with a number of STEM professionals and college students
- Discussions on the nature, requirements and perspectives of professional engineering careers as well as college life
- Parents/guest speaker invitation to the Friday lunch

TAMUK financial aid, housing, admission and STEM departmental presentations and a campus tour for parents

Competitions:
- Oral presentation judging by qualified external faculty/staff
- Notebook judging by the camp faculty/graduate assistants

Two different surveys:
  i. Daily camp evaluations: Satisfaction ranking for written questions and possible comments, assess camp execution efficiency, locate/correct potential problems promptly for smooth camp execution, provide insight for future camps
     - Seven key questions: How satisfied are you with today’s overall camp experience? How satisfied are you with today’s snacks and lunch? How satisfied are you with today’s guest speakers?, How satisfied are you with today’s project? How satisfied are you with the faculty, staff and graduate assistant performance today? How satisfied are you with the performance of your team chaperone? What would you like to see improved in the quality of today’s experience?

  ii. Final camp survey:
     - Many questions to evaluate the effectiveness and outcomes of the camp
     - Some questions required by the sponsoring agency
**ESF — Sample Final Survey Results and Testimonials**

- **What attracted you to ESF (Check all that apply)**
  - The educational experience (21)
  - The competition awards (12)
  - The opportunity for hands-on training/research (20)
  - Other (2): be around like-minded people, staff, interesting

- **Because of my participation in ESF I would like to pursue a degree in:**
  - Engineering (16)
  - Chemistry (4)
  - Mathematics (3)
  - Physics (1)
  - Other (10)

- **Because of my participation in ESF, my skills in the following have improved. (Check all that apply)**
  - My writing skills (12)
  - My oral presentation skills (21)
  - My teamwork skills (20)
  - My documentation skills (18)
  - None of the above (0)
  - Other (1): comprehension

- **The information provided by the Admission Office will be helpful when applying to college.**
  - Strongly Agree (9)
  - Agree (10)
  - Disagree (3)
  - Strongly Disagree (1)
  - Not reported (1)

- **Although the projects were challenging, my faculty mentor(s) provide clear instructions so that I was able to understand what was expected of me and my teammates.**
  - Strongly Agree (15)
  - Agree (6)
  - Disagree (1)
  - Strongly Disagree (1)
  - Not reported (1)

- **The industry site visit helped me to understand more about what it is like to be an engineer.**
  - Very great extent (14)
  - Great extent (3)
  - Some extent (5)
  - Not at all (0)
  - Not reported (2)

- **Since my participation in ESF:**
  - I have decided on a degree program (14)
  - I am still undecided on a degree program (10)

- “This is a great camp, very hands-on, engaging, and I learned a lot. The staff are friendly & approachable & they feed you well :D”

- “The ESF camp was very fun, informative and I love the hands on experience”
The Javelina STEM summer program effectiveness has been demonstrated by the final surveys!

Prospective college candidates would seriously consider engineering careers **IF** they are exposed to projects that are
- Hands-on,
- Popular,
- Competitive design-oriented real world topics with clear end goals from a variety of STEM related disciplines

Other critical components for a successful summer camp:
- Close interactions with the camp faculty and assistants, industry professionals and University admission, financial aid, and housing officials,
- A field trip to an industry site,
- Smooth camp execution
- A campus tour for parents